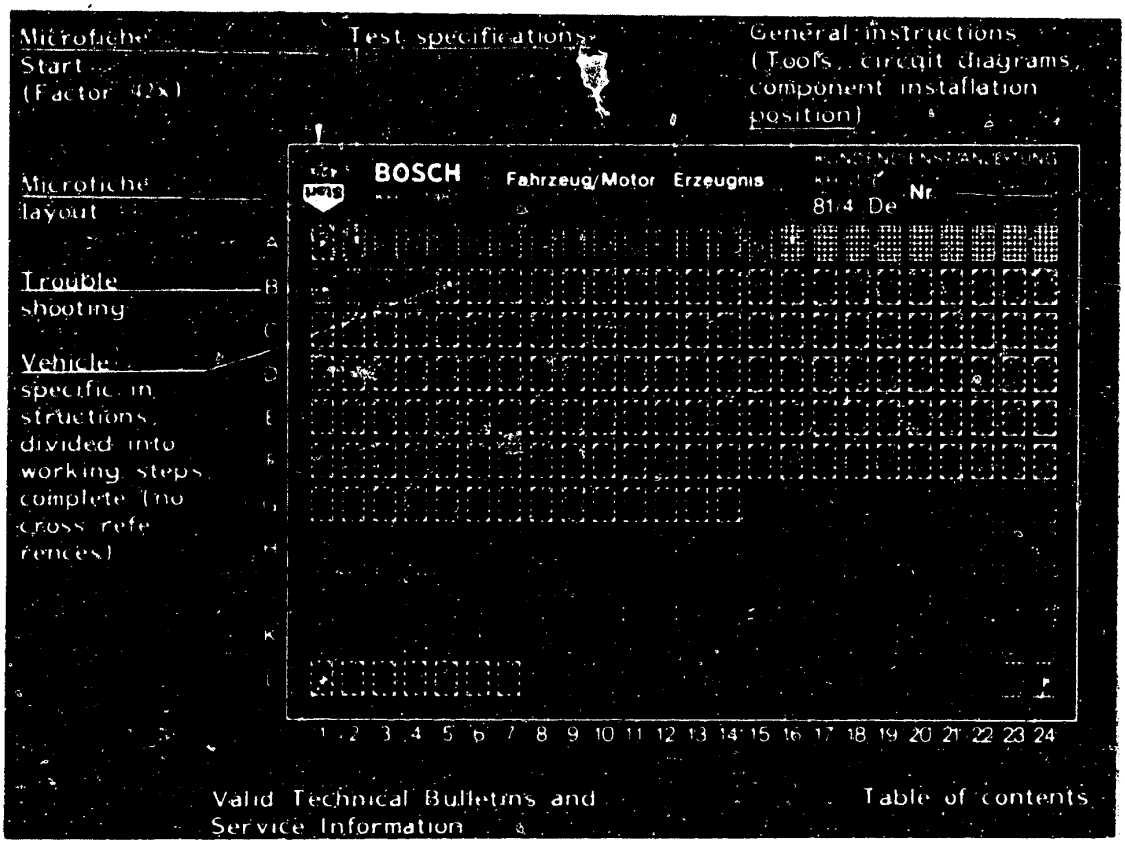
Microfiche layout



1. Read from left to right

2. Title of microfiche (appears on each coordinate)

E16	Product/assembly/test step Vehicle/engine	

Coordinate

3. Limits of section

Beginning | Mid-section | End | One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C6

A1	Trouble-Shooting Plan	⬇

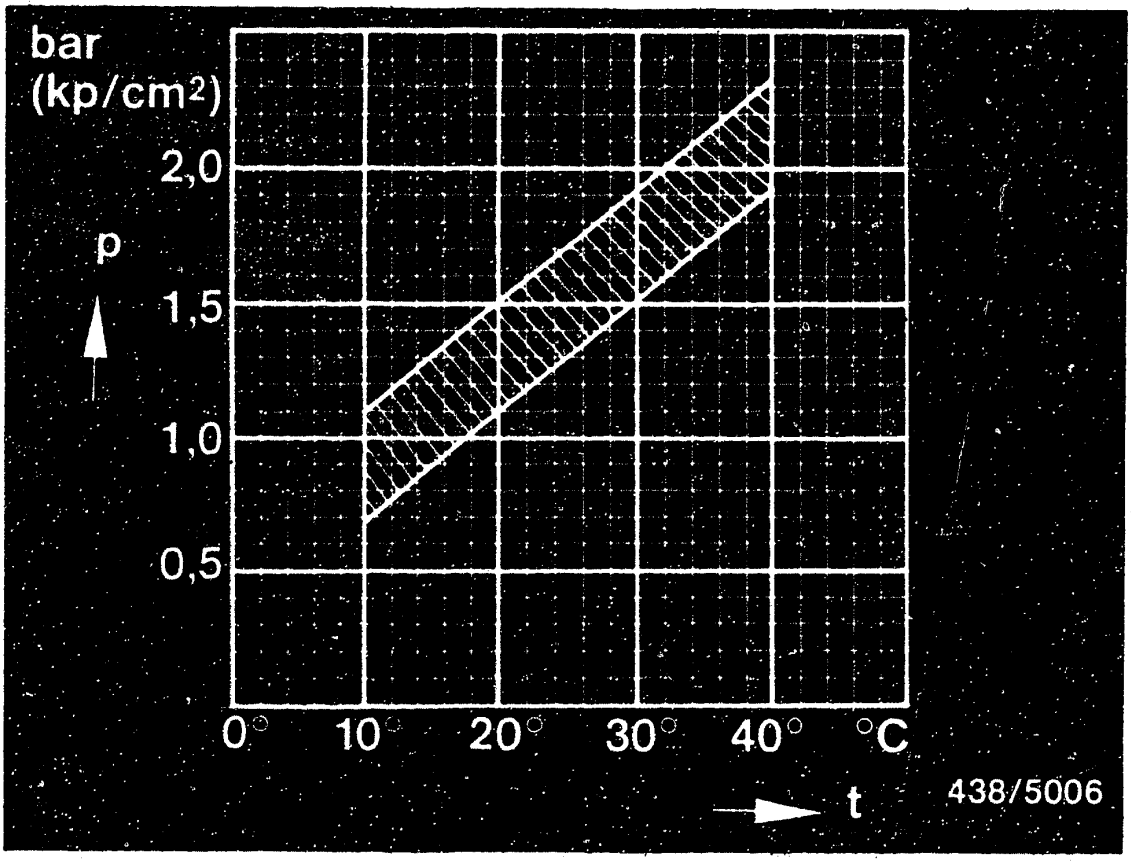
1. Test Specifications

1.1 Electric fuel pump

B 22

Test step

Delivered fuel quantity:	Test specifications:
3.5 l engine	at least 1000 cm^3/30 s
4.5 - 6.9 l engine	at least 1100 cm^3/30 s



p = Control pressure (gauge pressure)
t = Ambient temperature

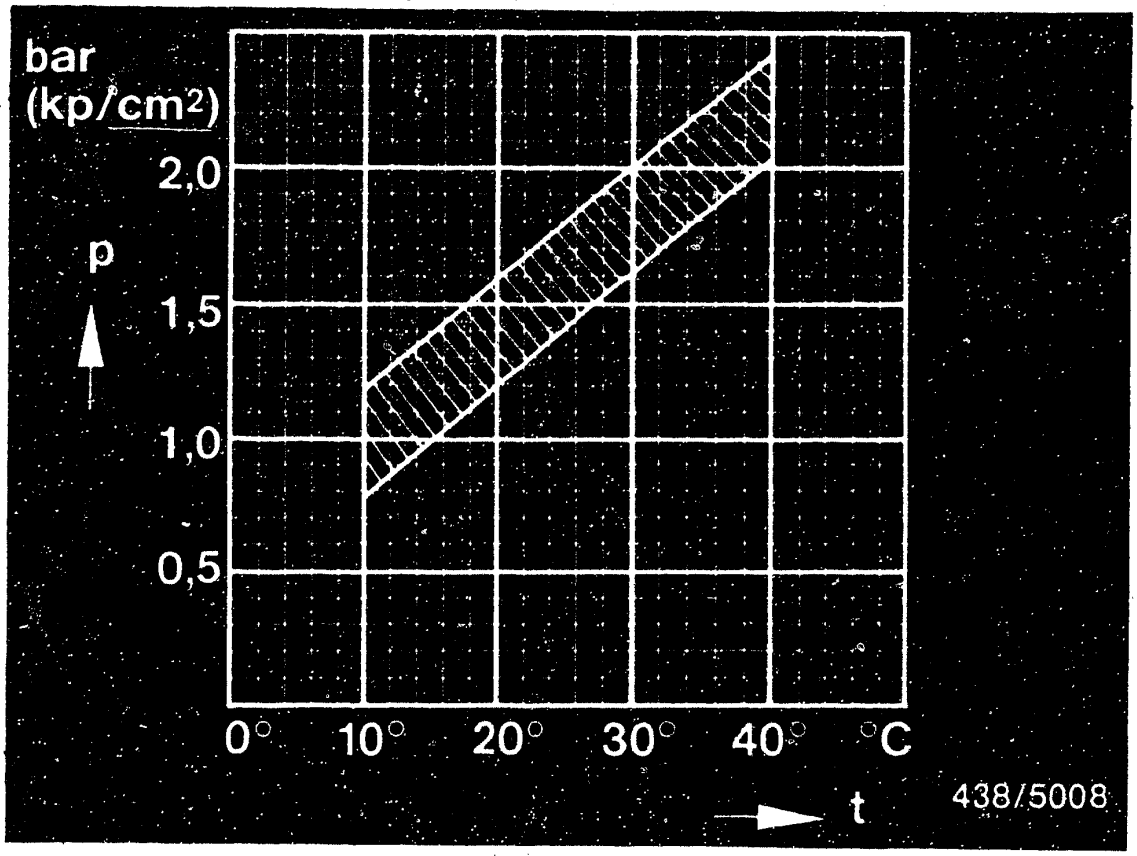
C 10

1.2 Control pressure "Cold"

- Part No. of warm-up regulator: 0 438 140 010
- Part No. of warm-up regulator: 0 438 140 028
  (Versions for full-load enrichment)

For checking, connect a vacuum pump to the manifold pressure connection of the warm-up regulator.

Setting value: 510...550 mbar
(385...415 mmHg)



p = Control pressure (gauge pressure)
t = Ambient temperature

C 10

Control pressure "Cold"

- Part No. of warm-up regulator: 0 438 140 056
  (Version for full-load enrichment)

For checking, connect a vacuum pump to the manifold pressure connection of the warm-up regulator.

Setting value: 510...550 mbar
(385...415 mm Hg)

Test step	Test specifications*

C10

1.3 Control pressure "Warm"

- Checking with atmospheric pressure (without vacuum).

Part No. of warm-up regulator:

0 438 140 010 0 438 140 056 to FD 930	2.8...3.2bar(2.9...3.3kgf/cm^2)
0 438 140 056 from FD 931	2.6...3.0bar(2.7...3.1kgf/cm^2)
0 438 140 028	2.5...2.9bar(2.6...3.0kgf/cm^2)

- For checking, connect a vacuum pump to the manifold pressure connection of the warm-up regulator.

Setting value: 510...550 mbar (385...415 torr)

Part No. of warm-up regulator:

0 438 140 010 0 438 140 028 0 438 140 056	3.4...3.8bar(3.5...3.9kgf/cm^2)

Leak test on full-load diaphragm

Maximum permissible pressure change from "Setting value".	100 mbar (75 mm Hg) / 15 s

*Pressures in the test-specification table are given in bar (gauge pressure) or in kgf/cm^2 (gauge pressure).

Test step		Test specifications*
1.4 Primary pressure		**D 11**
Fuel distributor		
0 438 100 012 }	Test value	5.2...5.8 bar (5.3...5.9 kgf/cm²)
0 438 100 034	Setting value	5.3...5.5 bar (5.4...5.6 kgf/cm²)
1.5 Leak test		**D 20**
Minimum pressure		
after 10 minutes:		1.7 bar (1.8 kgf/cm²)
after 20 minutes:		1.5 bar (1.6 kgf/cm²)

* Pressures in the test-specification table are given in bar (gauge pressure) and in kgf/cm² (gauge pressure).

Test step	Test specifications

1.6 Injection valves

E18

0 437 502 010

Opening pressure:	3.0...4.1 bar (3.1...4.2 kgf/cm²) (gauge pressure)

1.7 Fuel distributor

F6

Delivered-quantity comparison:	Setting point cm³/min	Max. allowable delivery cm³/min
Idle	6.0	7.2
Part load	40.0	46.0
Full load	100.0	110.0

1.8 Idle-speed adjustment

Note: Engine oil temp. approx. 80°C

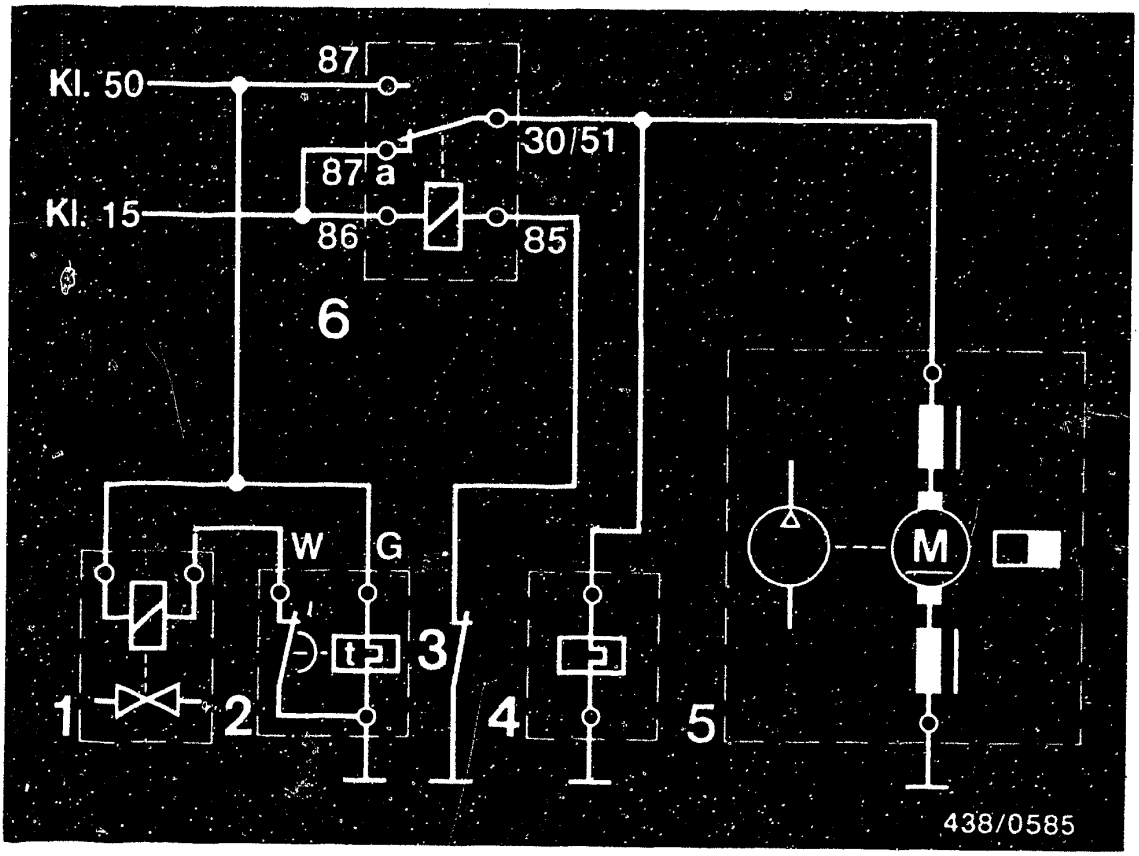
F18

- Idle speed

350/450 (116../117.. engine)	700...750 min^{-1}
450-6.9 (100.. engine)	580...620 min^{-1}

- CO concentration

350/450	0.5...1.5 % by vol.
450-6.9	1.0...2.0 % by vol.



2. Electrical safety circuit

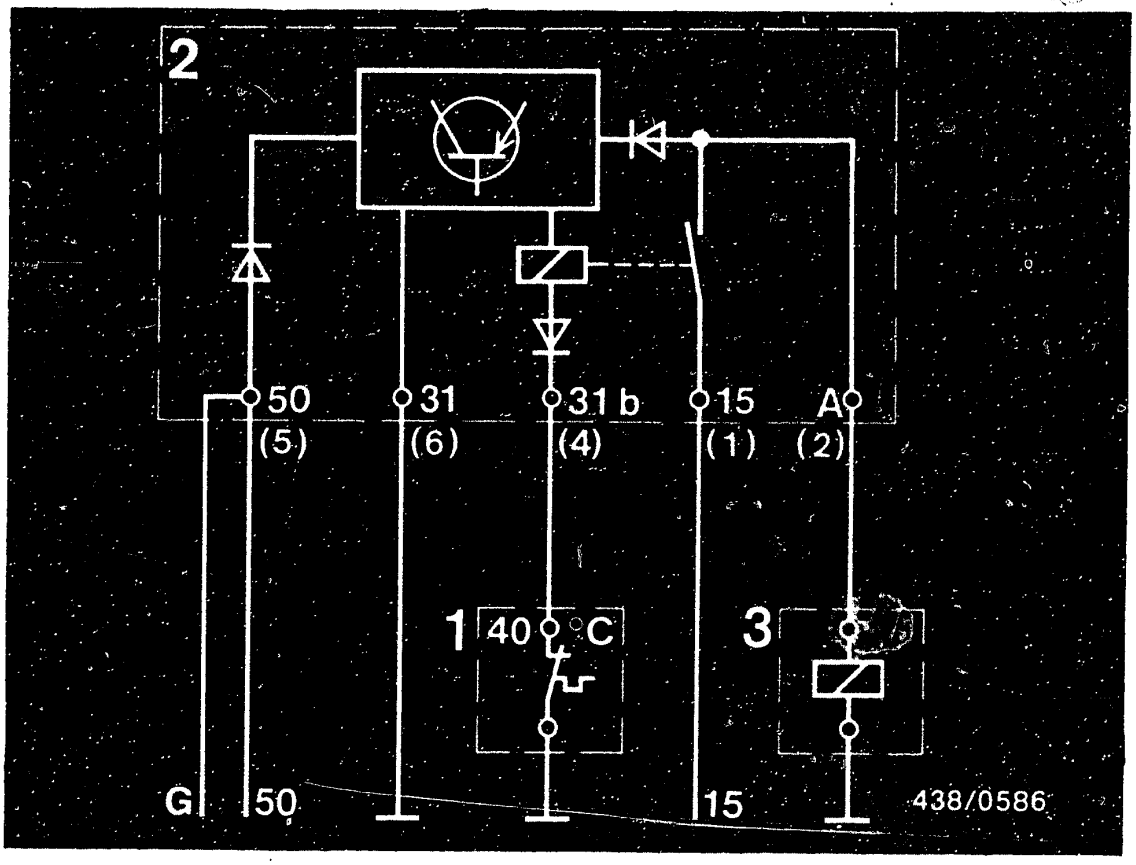
2.1 Diagram

1 = Start valve
2 = Thermo-time switch
3 = Air-flow sensor contact
4 = Warm-up regulator
5 = Electric fuel pump
6 = Relay

The safety circuit employs a relay which is triggered by the air-flow sensor contact.

2.2 Bridging the safety circuit

In order to carry out testing with the engine stationary, it is necessary to bridge the safety circuit. To do this, pull out electric plug from air-flow sensor and turn on ignition.
Thus the electric fuel pump and the warm-up regulator are provided with battery voltage.

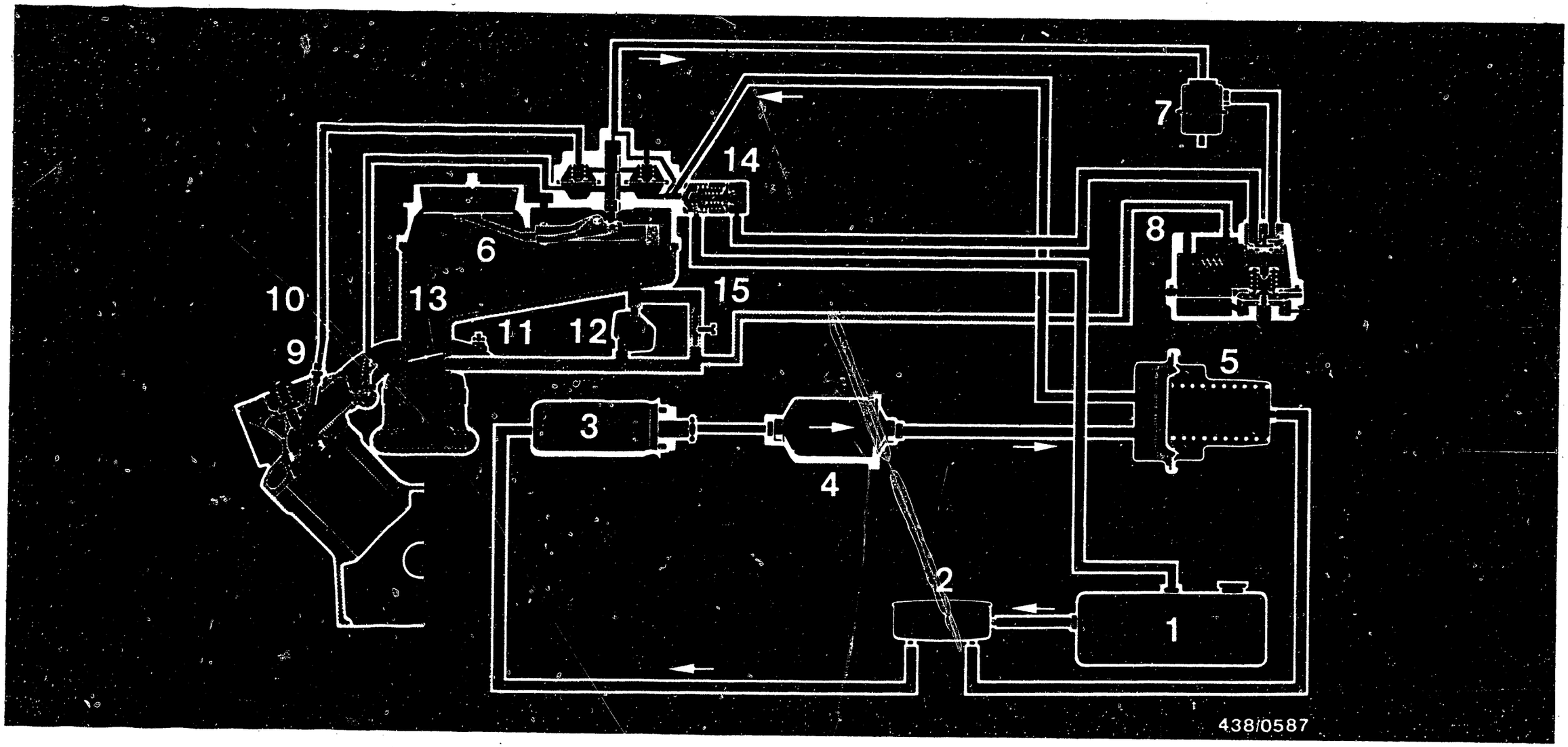


1 = Thermo-switch (+40°C)
2 = Warm start relay
3 = Warm start solenoid

2.3 Warm start solenoid

The warm-start solenoid 3 (only 6.9 l model 1975) operates the control lever of the air-flow sensor through a bell crank. It is activated for roughly 3 seconds above a coolant temperature of about +40 °C after a starting time of about 3 seconds. It is triggered via the thermo-switch 1 and relay 2.

During switching time, the air-flow sensor plate - and thus the control plunger - is deflected or raised more than is usual at cranking speed. Thus the amount of fuel injected is also greater, which causes, in addition, a flushing effect in the fuel-injection tubing.



3. Diagram of fuel lines

1 = Fuel tank
2 = Intake-noise damper
3 = Electric fuel pump
4 = Fuel filter
5 = Fuel accumulator
6 = Mixture-control unit with downdraft air-flow sensor
7 = Fuel-line-pressure damper
8 = Warm-up regulator
9 = Injection valve
10 = Start valve
11 = Thermo-time switch
12 = Auxiliary-air device
13 = Throttle valve
14 = Primary-pressure regulator with push valve
15 = Idle-speed screw (bypass)
▩ = Manifold pressure lines
□ = Fuel lines

4. General information

4.1 Introduction

The following vehicles are supplied with the 8-cylinder engine with K-Jetronic:

Model	Vehicle type	Engine type
350 SL, SLC	107.. as from 1976	116..
350 SE, SEL	116.. as from 1976	116..
450 SL, SLC	107.. as from 1976	117..
450 SE, SEL	116.. as from 1976	117..
450 SEL 6,9	116.. as from 1975	100..

This repair manual refers only to the above-mentioned vehicles and gives a concise description of the testing and adjustment operations to be performed on the vehicle on the K-Jetronic.

All the system components are dealt with in separate working steps with the corresponding test specifications.

In addition to this repair manual the appropriate testing and repair manuals will, of course, be issued for every other vehicle type equipped with the K-Jetronic.

The K-Jetronic differs from other known fuel-injection systems in terms of both construction and operation. In order to be able to carry out the testing procedures described in this manual - and therefore to be able to assess the components - the K-Jetronic and its operation should be clearly understood. The essential points of the operation and construction of the K-Jetronic are described in Technical Instruction VDT-U 3/1 En.

When performing troubleshooting on the K-Jetronic, the ignition must be working properly and the engine must be mechanically perfect.

The individual test steps in this repair manual are detailed and self-contained. Therefore it is possible to carry out troubleshooting in a particular area without having to carry out the whole testing programme for each fault.

The troubleshooting chart on Coordinates B 1 - B 4 should make it easier to determine the test steps to be carried out for particular faults.

Select the possible cause in the troubleshooting chart according to the symptom determined either by yourself or the customer. The coordinates at the end of the cause column indicate the corresponding test step and the test specification belonging to it.

Important note:

If any fuel-supply connections are disconnected or parts removed, in the vacuum system as well, then new seals must be used when reconnecting or refitting.

A high degree of cleanness must be maintained when carrying out work on the K-Jetronic. Before removing fuel-supply connections, clean them thoroughly.

4.2 Design

The entire system of the K-Jetronic in these vehicle types corresponds, with the exception of the differences listed below, to the basic design as described in Technical Instruction VDT-U 3/1 En.

4.3 Differences:

- Air-flow sensor in downdraft design.
- Primary-pressure regulator in the fuel distributor with combined push valve for sealing the return line from the warm-up regulator when the engine is switched off.
- Warm-up regulator for manifold-pressure-controlled full-load enrichment.
- Capsule valve with damping restriction in the fuel distributor as a connection between the control-pressure circuit and the chamber above the control plunger.
- Fuel-line-pressure damper in the control-pressure tubing between the fuel distributor and the warm-up regulator.
- Auxiliary-air device with expansion element heated by the coolant.
- Intake-noise damper in the fuel intake line (in order to prevent intake noises) between the fuel tank and the electric fuel pump (non-Bosch product).

- Fuel accumulator with doubled storage volume (40 cm^3). Positioned in the tubing between the fuel filter and the fuel distributor. The spring chamber is not vented to atmosphere but instead is connected to the fuel intake line by means of a hose line leading to the intake-noise damper.

- Electrical safety circuit for electric fuel pump and warm-up regulator. Due to this safety circuit the components are not supplied with power until the engine is being started, so that if only the ignition is switched on, the electric fuel pump cannot operate and the warm-up regulator cannot shut off prematurely.

- Warm-start solenoid on the air-flow sensor (only 1975 model).
  When starting at coolant temperatures of more than +40 °C, the warm-start device increases the deflection of the air-flow sensor plate. This causes more fuel to be injected for approx. 3 seconds.
  Thus the mixture is enriched and, in addition, a flushing effect is achieved in the fuel-intake tubing.

5. Test equipment and tools

- Pressure tester KDJE-P100 (previously KDEP 1034)

  For testing all fuel pressures and testing for leaks.

- Connecting-parts set KDJE-P100/11 (previously KDEP 1034/11)

  For connecting pressure tester KDJE-P100 (previously KDEP 1034) to the control-pressure port of the fuel distributor.

- Adjusting wrench KDEP 1035

  For adjusting the idle-mixture-adjusting screw in the mixture-control unit (idle-speed/CO adjustment).

- Guide ring KDEP 1040/14 (dia. 110 mm)

  For centering the air-flow sensor plate in the air-flow sensor.

- Tester for delivered quantity comparison KDJE-P200 (previously KDJE 7451)

  For comparing the fuel delivered from the individual fuel-distributor outlets.

- Line set KDJE-P200/25 (previously KDJE 7451/25)

  For connecting the tester for delivered quantity comparison to the K-Jetronic system with steel fuel-injection tubing.

- Electrical connection (test lead)
  KDJE 7450/70 for direct connection to components to be tested, e.g. cold-start valve.

- Graduate (commercially available, capacity approx. 1.5 l)

  For measuring the delivery of the electric fuel pump.

- Valve tester KDJE-P 400 (previously KDJE 7452).

  For testing the injection valves.

  Test media: Calibrating fluid (Shell K 30, Esso-Varsol, Shell Mineral Spirits 135).
  Or
  Bosch Part Designation VS 14 942-CH
  previously Part No. : 5 973 340 650.
  The calibrating fluid can be obtained in 5 l metal cans from the following supplier:
  Firma
  Oskar Gnamm GmbH & Co
  D-7531 Kä pfelbach-Bilfingen

Caution:
For safety reasons, never use normal gasoline or similar easily inflammable and combustible liquids. Even with calibrating fluid, be sure to observe the local official regulations.

- Tachometer (commercially available)

For idle-speed adjustment.

- CO meter (commercially available)

For idle-speed CO adjustment.

- Vacuum pump (commercially available)

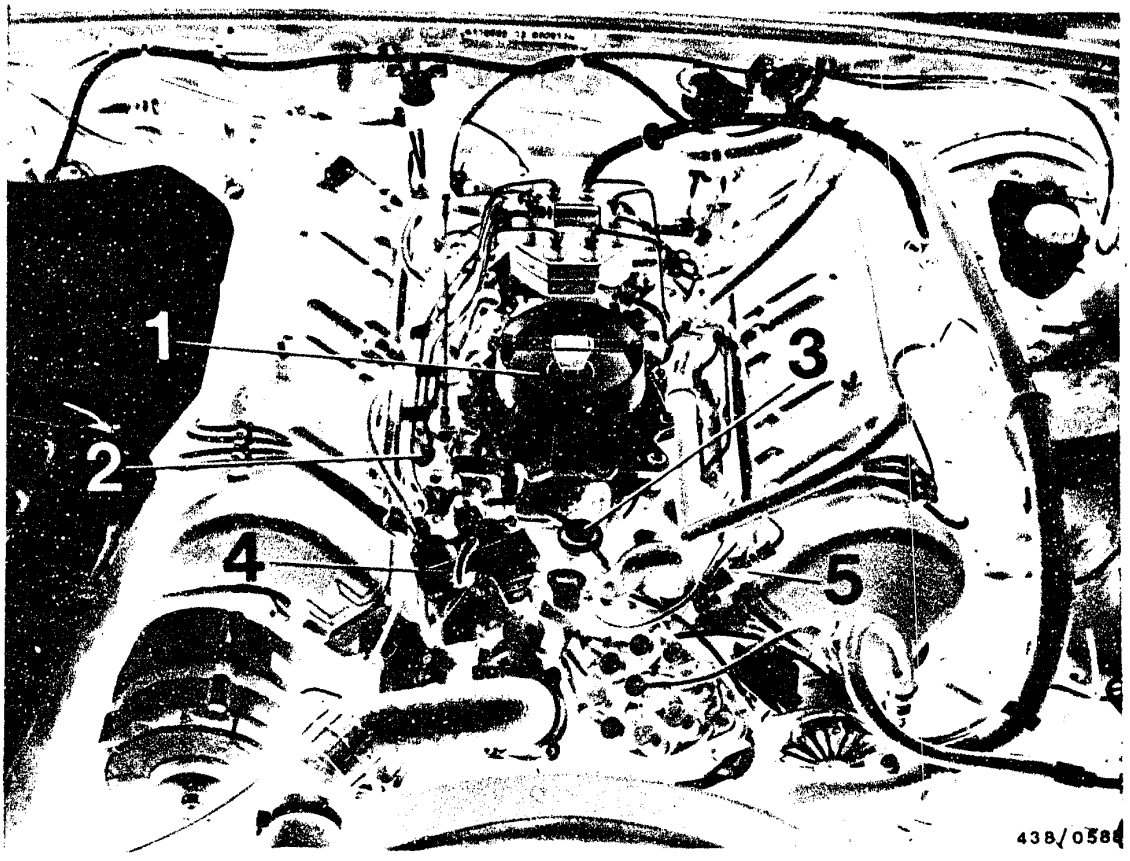
For testing warm-up regulators with manifold-pressure-controlled full-load enrichment.

Use for example vacuum hand pump "Mityvac" from
Firma Korinth
Ludwig-Kloos-Straße 21
D-6450 Hanau 7 (Steinheim)

- Setting device KDJE 7456

For deflecting the air-flow sensor plate (downdraft air-flow sensor) when comparing the fuel deliveries from the fuel-distributor outlets.

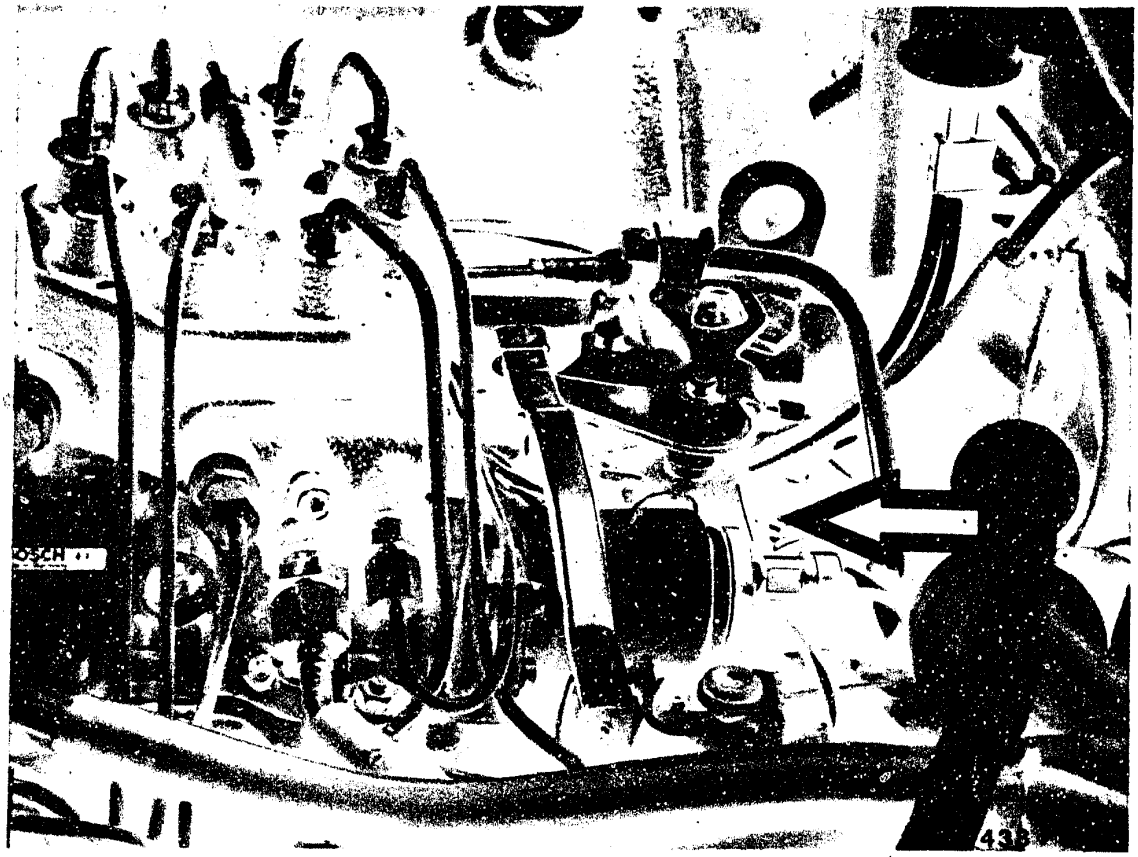
- Tool set for removing and fitting the idle-speed anti-tamper device of the air-flow sensor.
(e.g. No. 4521/7 from Hazet Co., D-5630 Remscheid).



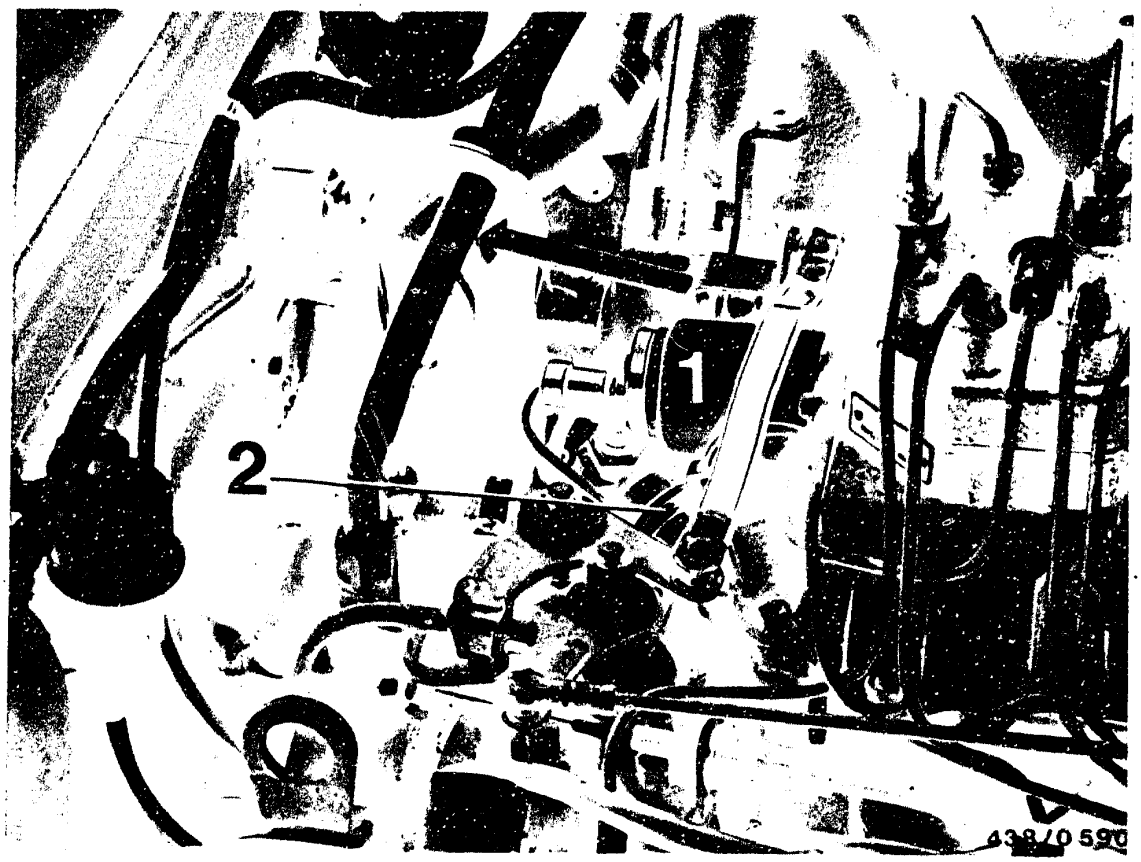
1 = Mixture-control unit
2 = Injection valves
3 = Auxiliary-air device
4 = Warm-up regulator
5 = Start valve

6. Installation position of individual components

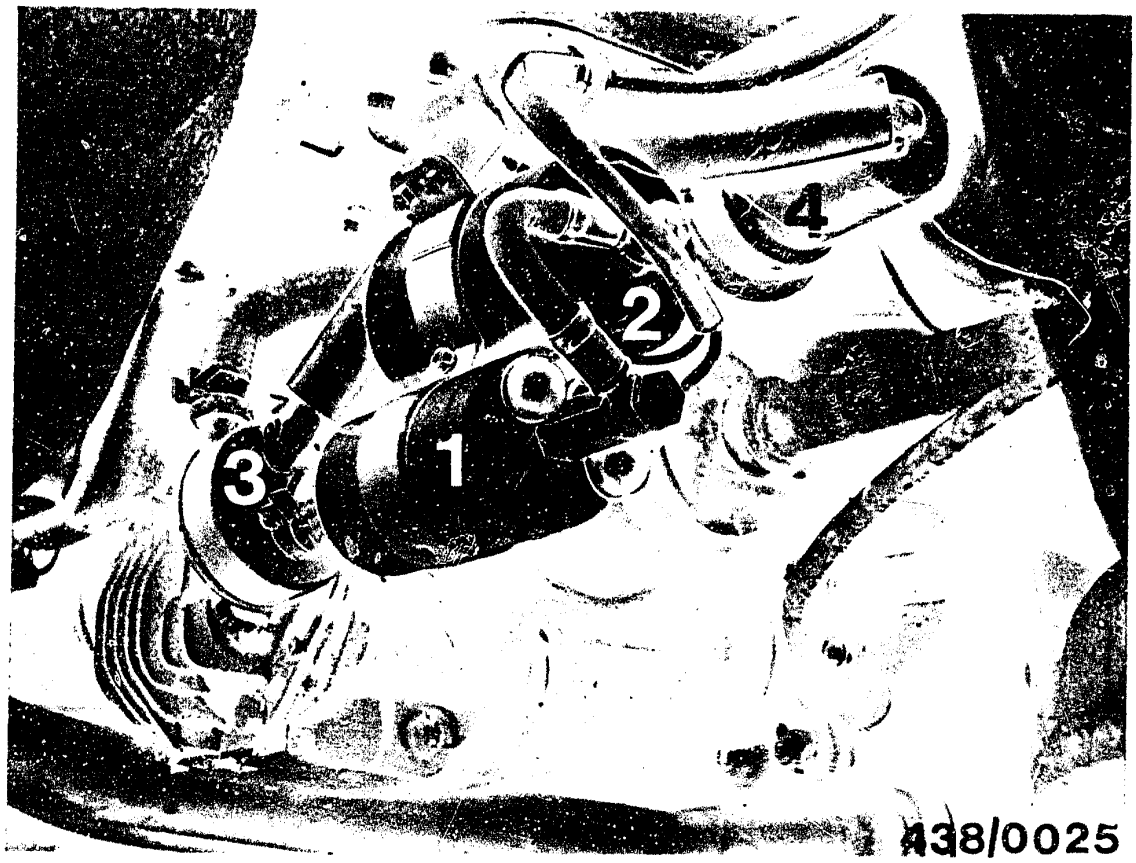
6.1 Arrangement of components on the engine (Air filter removed)



Arrow - thermo-time switch



1 = Warm-start solenoid
2 = Fuel-line-pressure damper



1 = Electric fuel pump
2 = Fuel filter
3 = Intake-noise damper
4 = Fuel accumulator

6.2 Fuel-supply components

Intake-noise damper, electric fuel pump, fuel filter and fuel accumulator are fastened on a support piece underneath the vehicle (on the right-hand side seen from behind the vehicle) above the rear axle.
These components are protected against road dirt by a dirt deflector (removed in the picture).
The connections of these components should be thoroughly cleaned before opening.

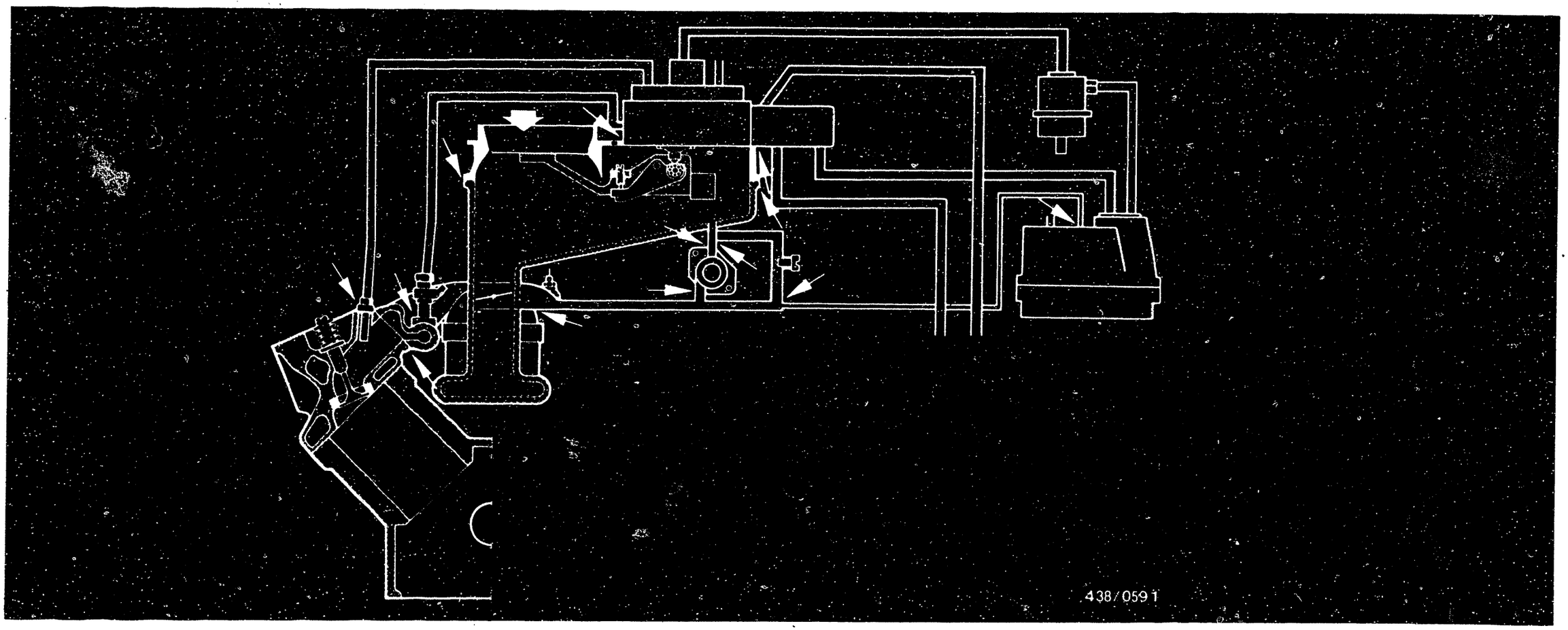
7. Trouble-shooting chart (also see coordinates B3/B4)
Customer complaint (fault symptom)

1. Engine does not start, or starts poorly, in cold condition
2. Engine does not start, or starts poorly, in warm condition*
3. Irregular idling during the warm-up phase (shakes)
4. Irregular idling with warm engine (shakes)
5. Engine does not draw gas, burbles
6. Engine misfires when operating on the road, high load
7. Insufficient power

* Note
If, in the case of Symptom 2, after checking and repairing all the fault causes listed below, the hot-start characteristic is still unsatisfactory this can be improved by fitting an impulse relay.
The fitting of this relay is described in Coordinate L6.

1	2	3	4	5	6	7	Cause	Coordinates
	●	●	●	●		●	Vacuum system leaking	B5
●	●		●	●	●	●	Air-flow sensor lever and/or control plunger not moving smoothly	B7
	●						Position of the air-flow sensor plate incorrect	B16
●		●					Auxiliary-air device does not open	B21
●	●				●		Electric fuel pump not operating	B22
●							Cold-start system defective	C6
		●	●				Cold-start valve leaking	C8
				●			Excessive fuel delivery for control-pressure circuit	C11
●		●					"Cold" control pressure outside tolerance	C10
	●		●	●	●	●	"Warm" control pressure too high (after warm-up)	C10
			●	●		●	"Warm" control pressure too low (after warm-up)	C10
					●	●	Primary (system) pressure outside tolerance	D11
	●						Overall fuel system leaking	D20
●	●	●	●		●		Injection valves leaking, opening pressure too low	E18
●	●	●	●			●	Unequal fuel delivery (imbalance of fuel delivery)	F6
●	●	●	●	●			Basic idle adjustment incorrect	F18
						●	Throttle plate does not open completely	

(continued) 8. Engine runs on after being switched off ("diesels")	9. Fuel consumption too high	10. Flat spot during acceleration	11. CO concentration during idling too high	12. CO concentration during idling too low	13. Idle-speed cannot be adjusted (too high)	14. Engine starts but then immediately stops	Cause	Coordinates
		●		●			Vacuum system leaking	B5
●		●	●	●			Air-flow sensor lever and/or control plunger not moving smoothly	B7
●							Position of the air-flow sensor plate incorrect	B16
							Auxiliary-air device does not open	B21
					●		Auxiliary-air device does not close	B21
						●	Electric fuel pump not operating	B22
							Cold-start system defective	C 11
●	●		●				Cold-start valve leaking	C8
		●				●	Excessive fuel delivery for control-pressure circuit	C11
		●				●	"Warm" control pressure too high (after warm-up)	C10
	●	●	●			●	"Warm" control pressure too low (after warm-up)	C10
		●				●	Primary (system) pressure outside tolerance	D11
							Overall fuel system leaking	D20
●							Injection valves leaking, opening pressure too low	E18
		●					Unequal fuel delivery (imbalance of fuel delivery)	F6
●	●	●	●	●			Basic idle adjustment incorrect	F18
							Throttle plate does not open completely	



Working steps

8. Check the air-intake system of the engine for leaks

The arrows in the diagram show typical points where leaks can occur. Check by performing a visual inspection or, in cases of doubt, as follows:

Disconnect the hose from the outlet of the auxiliary-air device and blow air through this hose into the intake system using a compressed-air gun. The throttle valve is to be fully open. Brush connection points with soapy water, or spray with leak detector (e.g. Güpoflex).
Under no circumstanes may combustble liquids be used when testing for leaks.
The formation of bubbles or foam indicates a leak. If a leak has been eliminated, it is necessary finally to adjust the idle speed with the engine at normal operating temperature: Idle-speed adjustment is described on Coordinates F 18.

9. Check the control lever in the air-flow sensor and the control plunger in the fuel distributor for ease of movement.

9.1 Preparations

- Engine temperature not below +20°C.
- Remove the air filter so that the air-flow sensor plate becomes accessible.
- Switch on the electric fuel pump for approx. 10 seconds by bridging the safety circuit.
  This results in application of the control pressure to the control plunger in the fuel distributor.

9.2 Check that the control lever moves freely

Depress the air-flow sensor plate by hand (downdraft) and release again.

The sensor plate snaps back into the zero position and bounces up about twice from the spring-loaded stop.

If the control lever does not move freely, first release all fastening screws holding the air-flow sensor to determine whether housing deformation is the cause of the problem.

If this is the case, remove the seal between the mixture-control unit and the air guide housing and replace it by sealant Curil K2 or Hylomar (Bosch Part No. 5 927 350 002).

Fitting:

Remove mixture-control unit.
Remove seal between mixture-control unit and air guide housing. Clean the sealing surfaces on the mixture-control unit and the air guide housing.
Coat the sealing surface on the air guide housing with Curil K2 or Hylomar.
Put the mixture-control unit back on and tighten the screws uniformly cross-wise to a torque of 9...10 Nm (0.9...1.0 kgfm).

Check the sealing surface on the mixture-control unit for leaks as follows:

Remove the hose at the outlet of the auxiliary-air device and blow air through this hose into the intake system using a compressed-air gun. The throttle valve is to be fully open. Brush seal points with soapy water or spray with leak detector (e.g. Güpoflex).

Under no circumstances may combustible liquids be used when testing for leaks.
The formation of bubbles or foam indicates a leak. Let engine run.
Check all fuel-supply connections for leaks.

Finally adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinates F 18.

If the housing is not deformed, then the air-flow sensor must be repaired or replaced.

9.3 Check that the control plunger moves freely

Depress the air-flow sensor plate by hand (downdraft). The same resistance must be felt over the entire movement.

Move the sensor plate rapidly back to a position just in front of the zero stop. The control plunger follows this rapid movement of the sensor plate only sluggishly, and therefore initially loses contact with the sensor plate lever. It must be possible, however, to feel the plunger make contact with this lever again. If this condition is fulfilled, the control plunger can be considered to move freely.

If the control plunger does not move freely, remove the fuel distributor from the air-flow sensor.

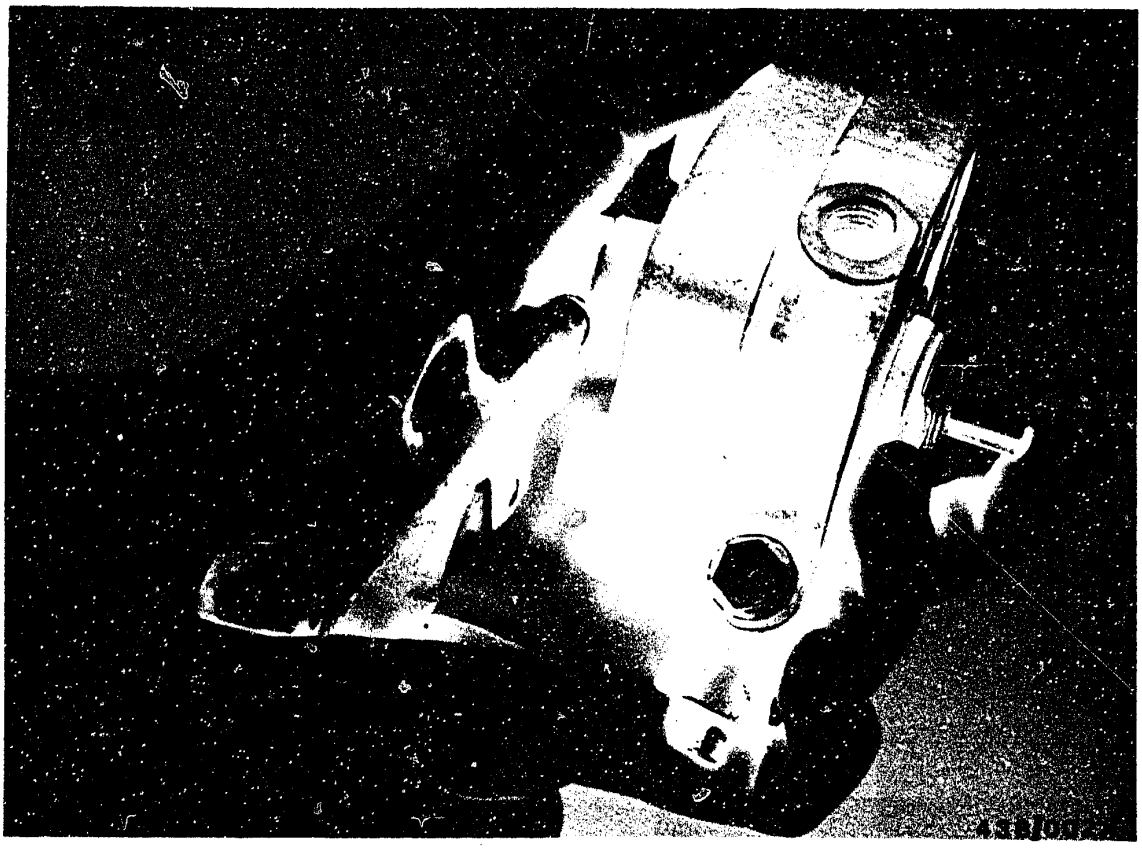
Important!
Note the following when installing fuel components and fuel lines:

Always ensure utmost cleanliness when loosening or tightening the fuel connections. No dirt must enter the fuel system.

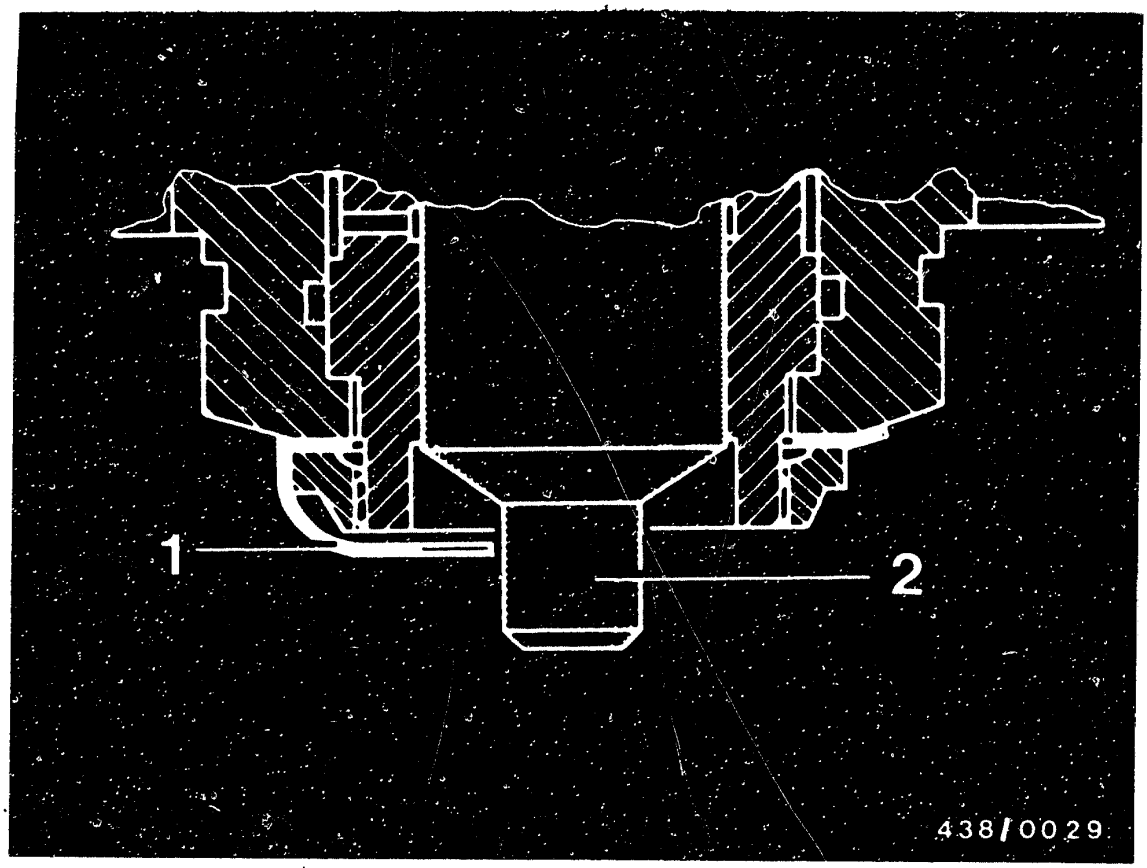
When loosening or tightening the fuel connections, apply counter-force at the fixed hexagon of the component.

Clean the fuel distributor thoroughly in the region of the fuel connections. Screw off all connections.

Screw out three fastening screws and remove the fuel distributor from the air-flow sensor.
The steel tubing must not be bent!



Remove the plunger. Under certain conditions, in order to do this it may be necessary to blow compressed air briefly against the plunger through the control-pressure connection hole. Hold the plunger with your hand while doing this. Clean the plunger thoroughly with benzine. If the plunger still does not move freely, replace the fuel distributor.

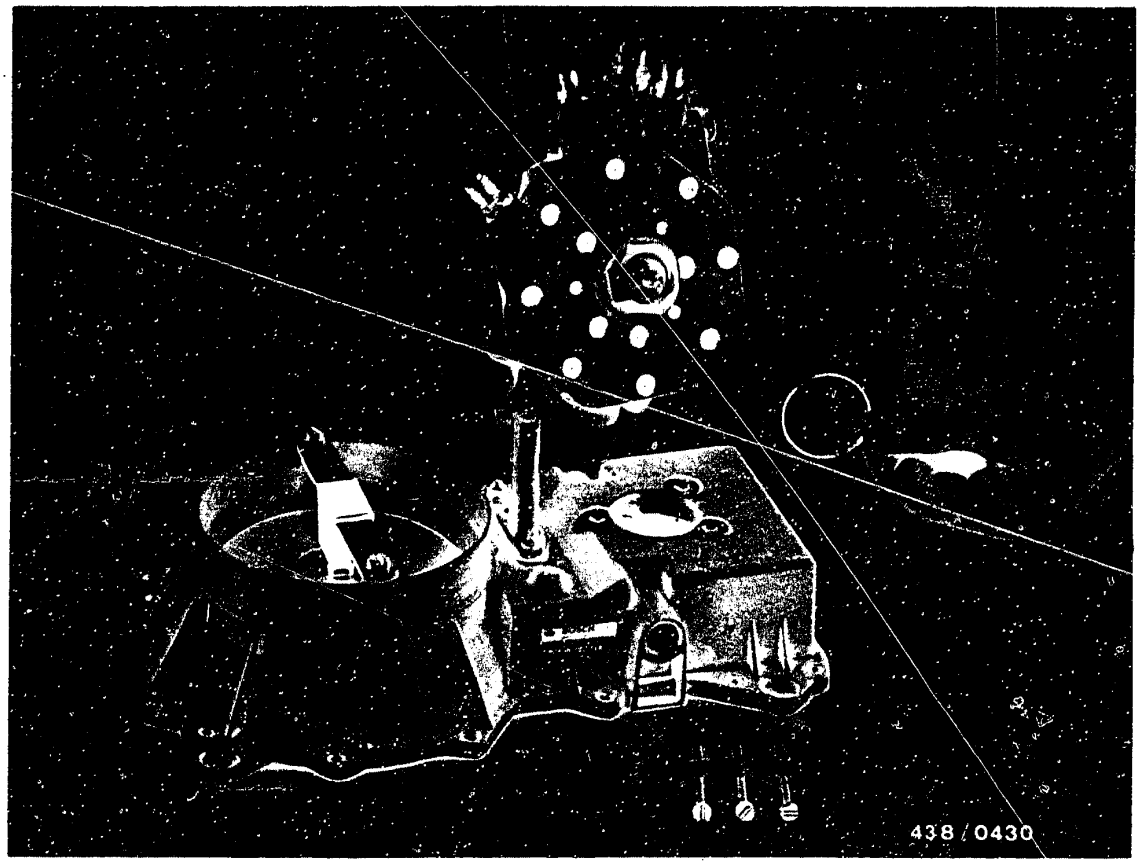


1 = Anti-drop-out device
2 = Control plunger

9.4 Fuel distributor with anti-drop-out device for the control plunger

Caution!
As from the date of manufacture 724 (4.77) the fuel distributors 0 438 100 011 and 012 have an anti-drop-out device for the control plunger.
This also protects the plunger in transit and facilitates installation.

The anti-drop-out device must not be removed!



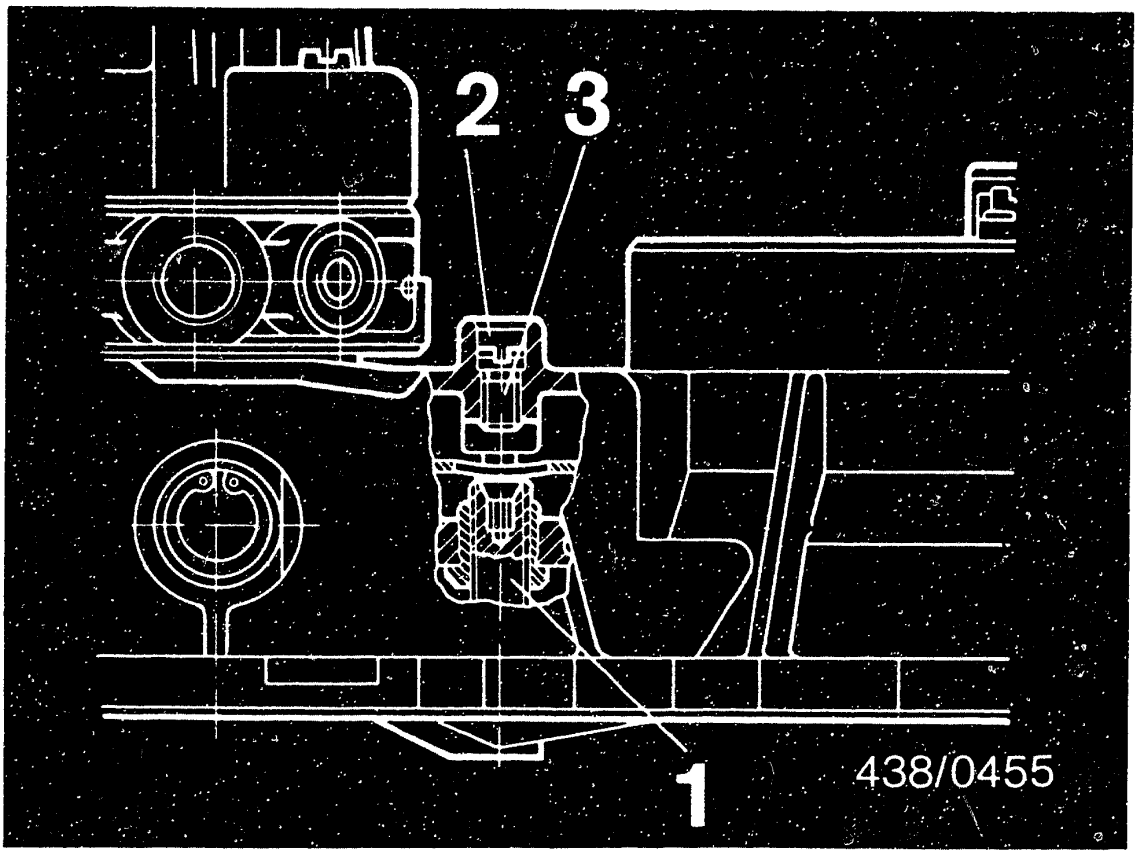
9.5 Fitting the fuel distributor

When fitting the fuel distributor, use a new seal ring between fuel distributor and air-flow sensor. Observe the tightening torque 3.2...3.8 Nm (0.32... 0.38 kgfm) for the fastening screws precisely.

When connecting the fuel-injection tubing, use new seal rings.

Caution:

The connection screws of the fuel-injection lines on the fuel distributor should be tightened to a torque of 10...12 Nm (1...1.2 kgfm); if tightened too much, there is the danger that the lines may be crushed.

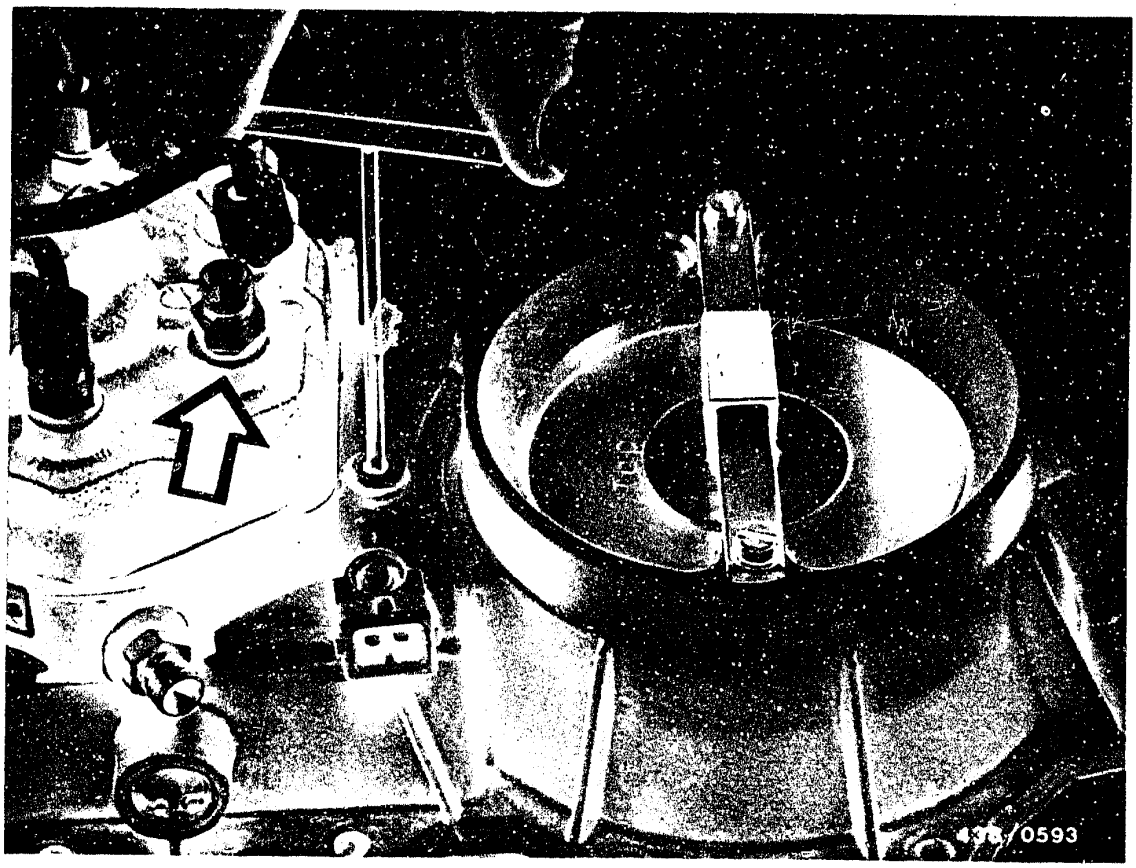


9.6 Matching the fuel distributor to the air-flow sensor for initial starting

Screw off one fuel-injection line from the fuel distributor.
Bridge the electrical safety circuit so that the electric fuel pump operates.

The bore to the idle-mixture-adjusting screw (1) is closed by a screw plug (3) and an anti-tamper device (lead seal) (2).

Remove the anti-tamper device and unscrew the screw plug. Insert the adjusting wrench KDEP 1035 through the bore into the idle-mixture-adjusting screw.

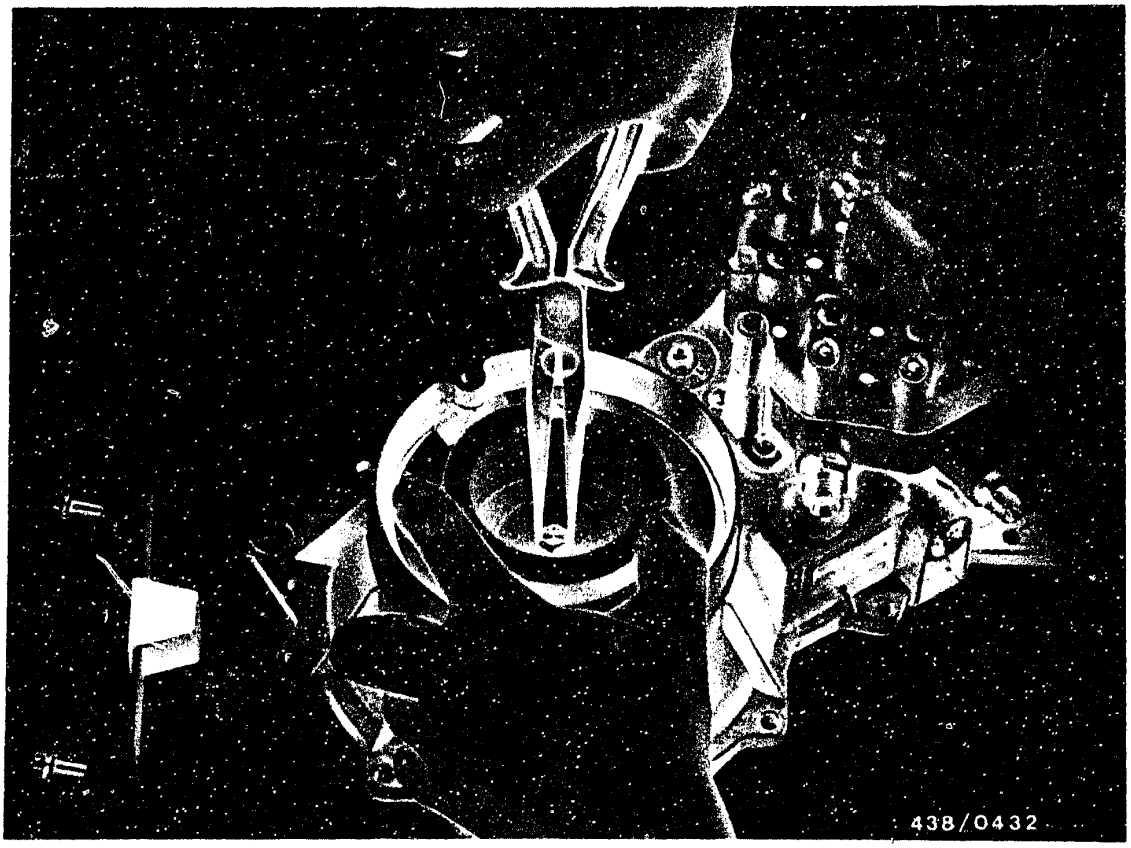


Screw in the idle-mixture-adjusting screw slowly and without exerting any great pressure on the adjusting wrench until fuel is just delivered from the open outlet (arrow) of the fuel distributor. Then turn back the adjusting screw by 1/2 turn.

Re-connect the fuel-injection line to the fuel distributor, start the engine and warm up.

The final matching of air-flow sensor and fuel distributor is carried out by adjusting the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F18.



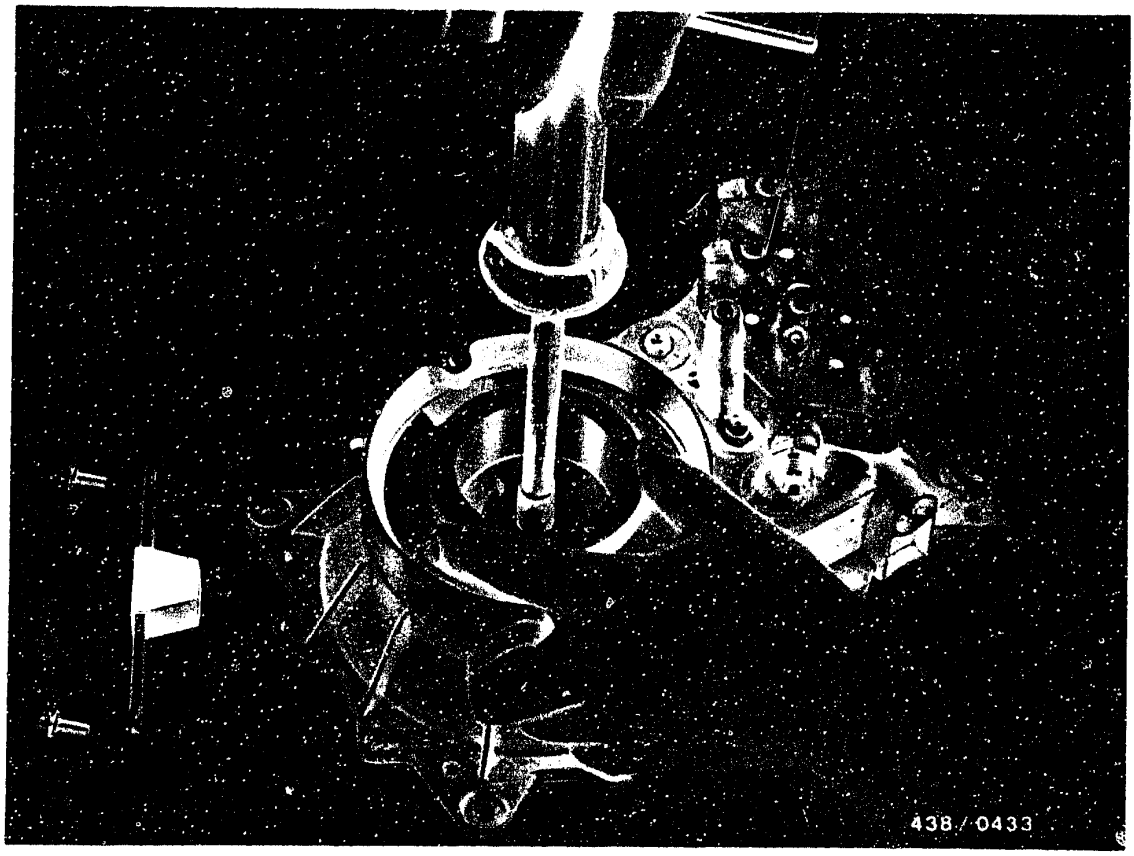
10. Checking and adjusting the position of the air-flow sensor plate

10.1 Preparations

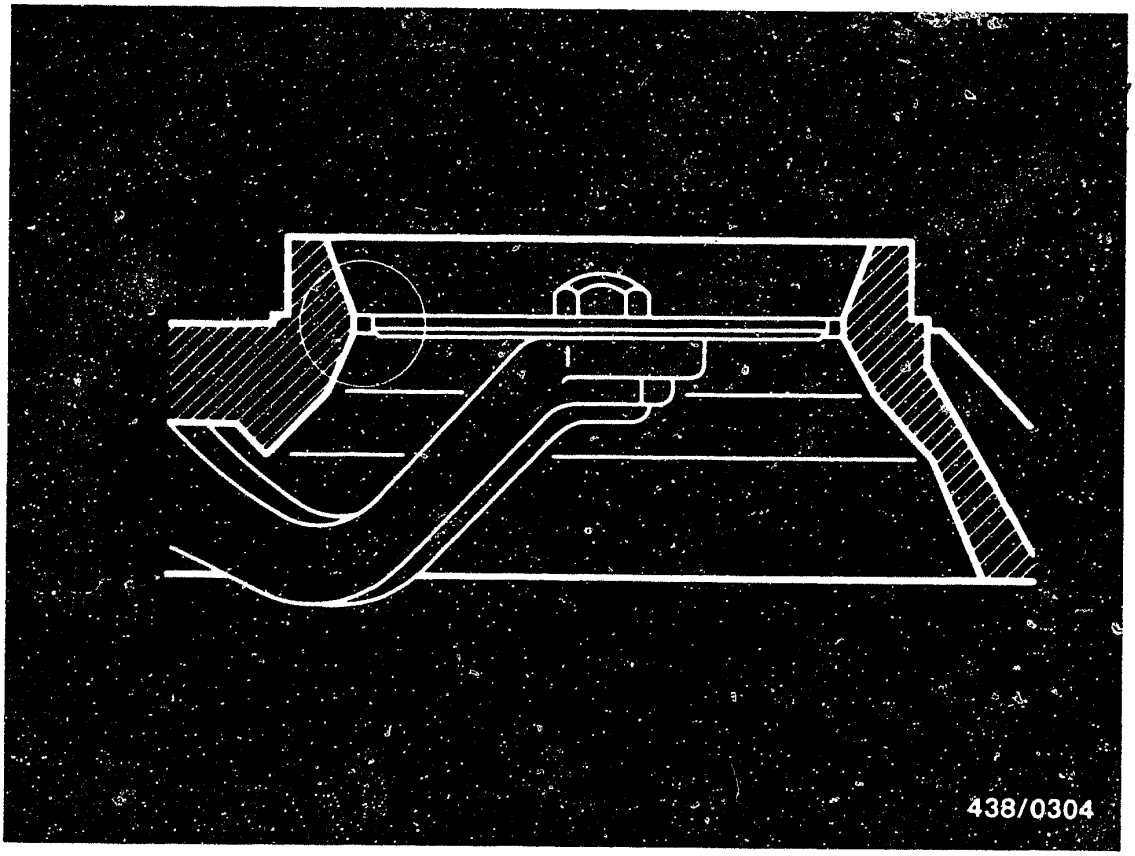
- Engine temperature is not important.
- Remove the air filter so that the air-flow sensor plate becomes accessible.

10.2 Centering the air-flow sensor plate

Check that the sensor plate is flat (not bent) and that it can move through the narrowest part of the air funnel without touching the funnel. If necessary, center it using a positioning ring KDEP 1040/14 (dia. 110 mm) as follows:



Remove the stop bracket after loosening the two fastening screws.
Loosen the sensor plate fastening screw. Insert the positioning ring while holding the fastening screws with pliers so that the sensor plate does not deflect downwards.
With the positioning ring in place, tighten the fastening screw with a torque of 5,0...5,5 Nm, loosen again and tighten again with the same torque.
When tightening the screw make sure that the air-flow sensor plate is in its zero position (in the cylindrical part of the air funnel).
It must no longer be possible to turn the air-flow sensor plate by hand.

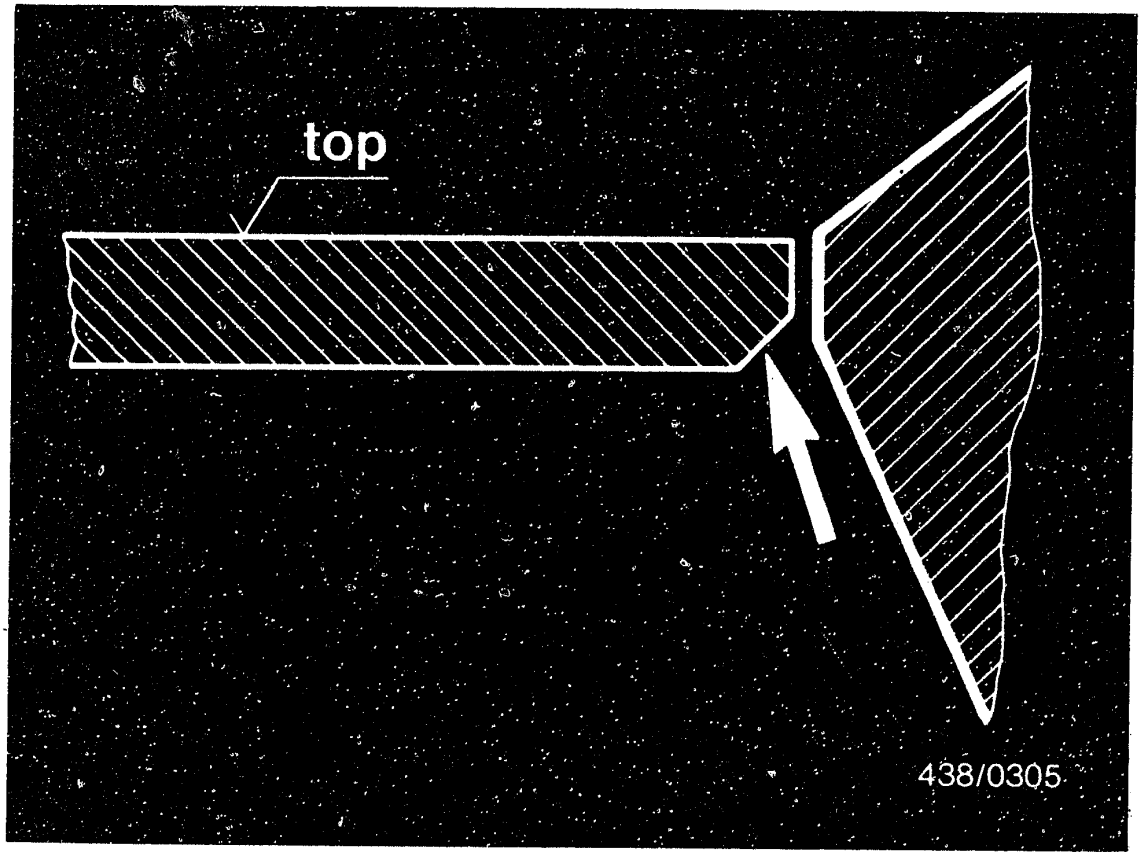


10.3 Checking and adjusting the zero position of the sensor plate
(Rest position):

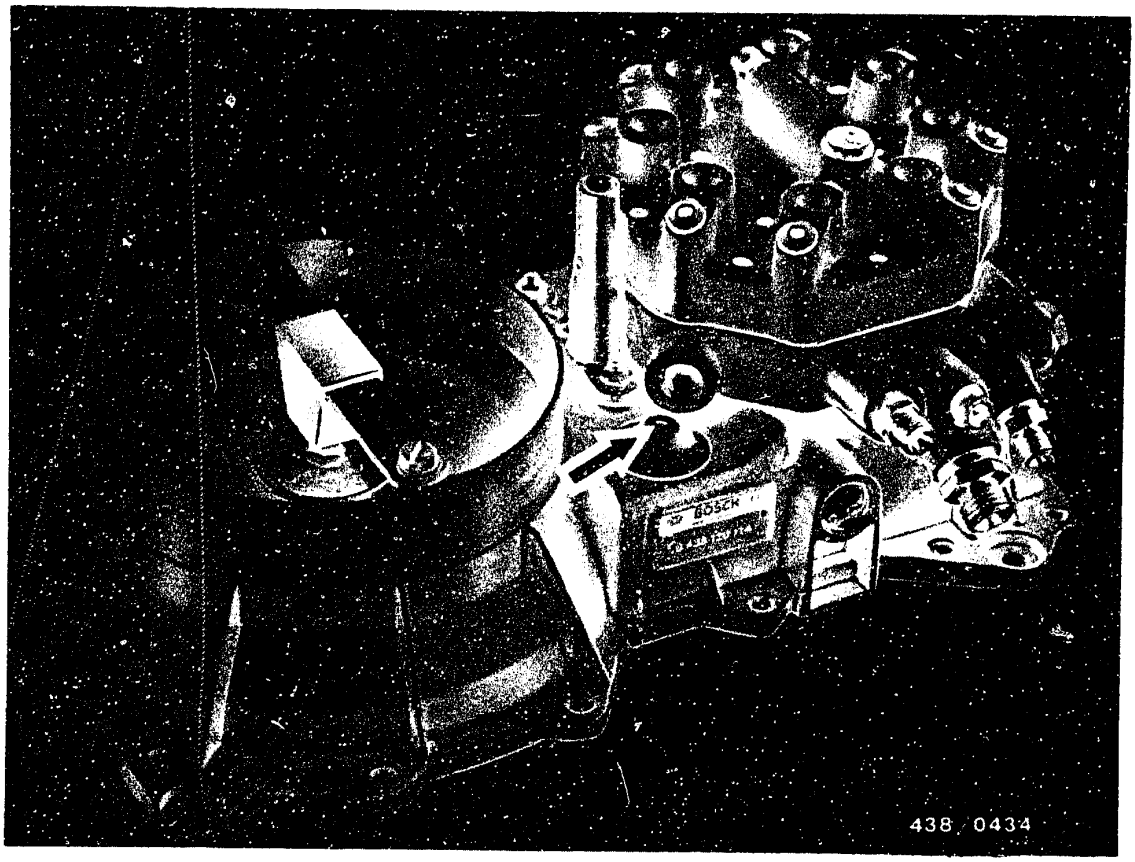
Switch on the electric fuel pump for approx. 10 seconds by bridging the safety circuit.
This results in application of the control pressure to the control plunger in the fuel distributor.

The upper edge of the sensor plate must be flush with the beginning of the cone (relief funnel, top) or max. 0.5 mm higher.

The air-flow sensor plate must be flat and must not project at any point on its circumference outside the cylindrical part of the air funnel.

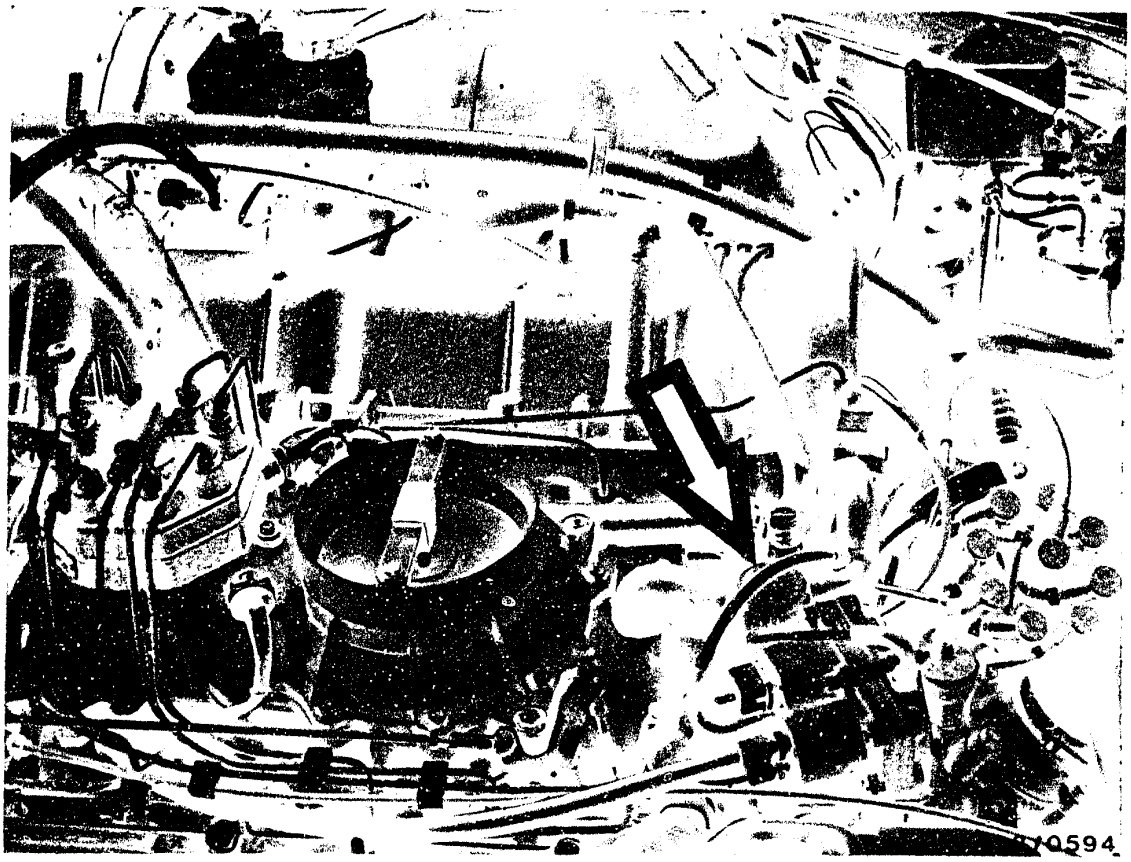


Caution:
The lower edge of the sensor plate is partially chamfered. Be absolutely sure that this chamfered edge is on the bottom (arrow). The upper side of the sensor plate is (in some cases) marked by the word "top".



If the sensor plate is positioned too high, an adjustment can be made. To do this, drive the guide pin (arrow) for the leaf-spring limit-stop deeper using a mandrel and a light hammer.

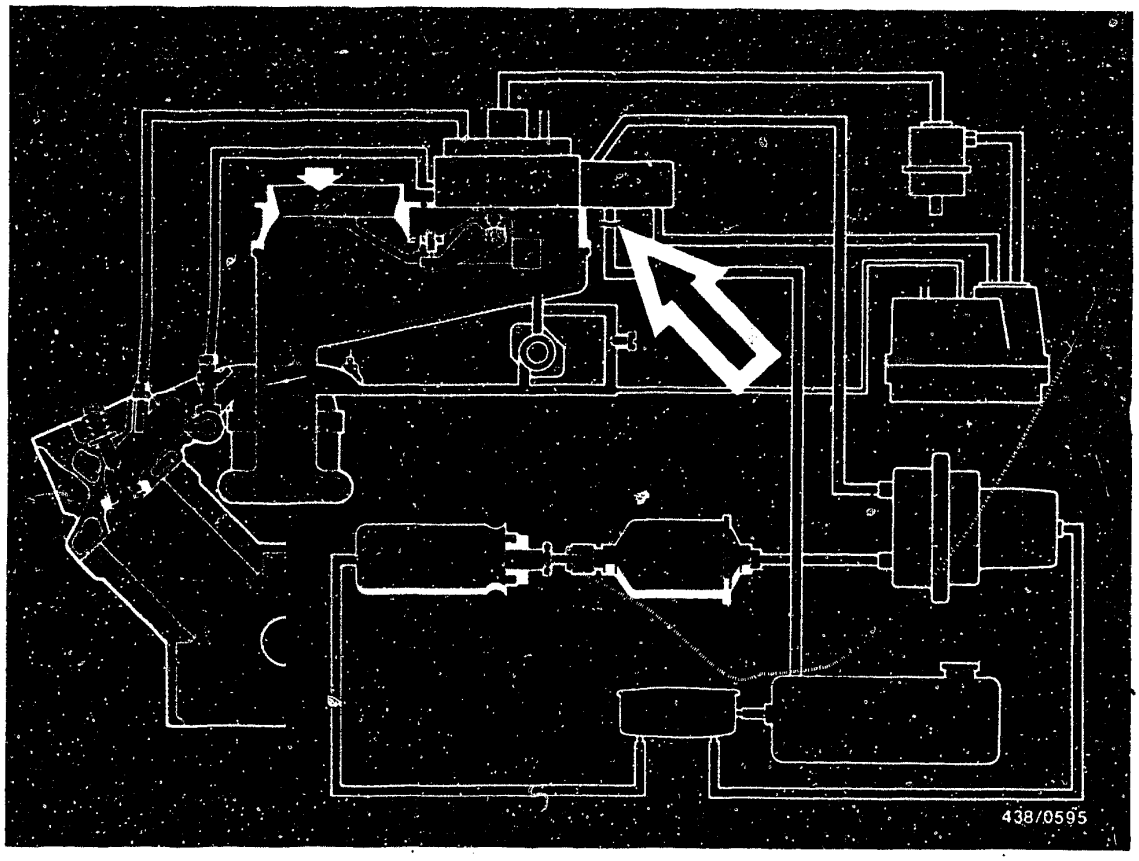
Caution:
Make this adjustment very carefully so that the guide pin is not driven in too far.
Be absolutely sure to avoid repeated adjustments in both directions because this can loosen the press fit of the pin. Serious engine damage can result if this pin should drop out.



11. Checking the operation of the auxiliary-air device (arrowed)

By making a visual check or, if necessary, by blowing through, check whether the blocking plate is partially open when the engine is cold.
If necessary, use a flashlight and mirror. If an opening is not visible with the engine cold, replace the auxiliary-air device.
When checking the closing process, the engine should be warmed up to normal operating temperature.
The blocking plate of the auxiliary-air device must be completely closed. Replace a defective auxiliary-air device.

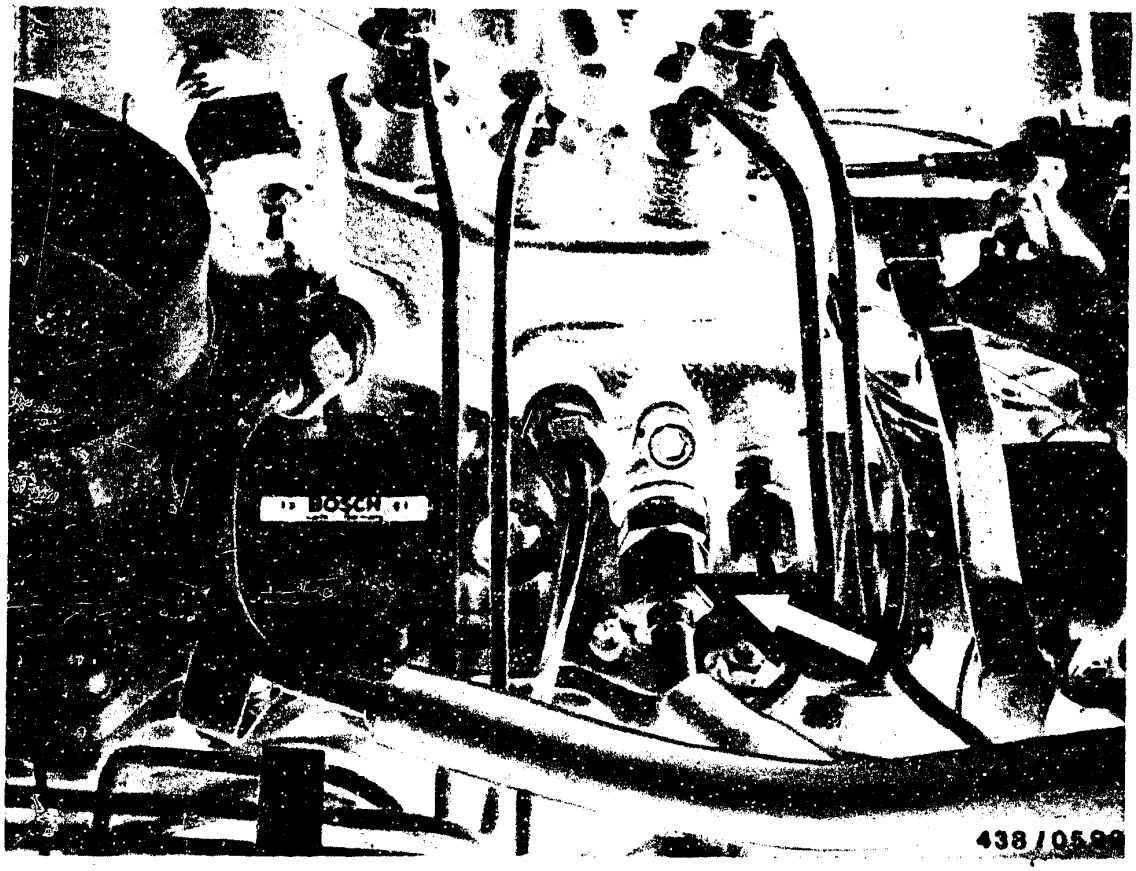
No electrical test is carried out since the auxiliary-air device is heated by coolant.



12. Checking the operation of the electric fuel pump.

12.1 Requirement

Conclusive information on the operation of the electric fuel pump can only be given by a measurement of fuel delivery under pressure, i.e. under primary (system) pressure. This measurement must therefore be made at the return line leading to the fuel tank (arrow).



12.2 Delivery of the electric fuel pump

Unscrew the fuel return line from the fuel distributor (arrow).
Equip a test hose (minimum inside diameter 8 mm) with a ball connector and union nut M 14 x 1.5 and connect to the return port of the fuel distributor.
Hold the end of the hose in a graduate (approx. 1.5 litres capacity) in order to make the measurement.
Pull off the plug from the warm-up regulator.
Switch on the electric fuel pump for 30 seconds by bridging the safety circuit.
Collect the fuel delivered during the 30 seconds in a graduate.

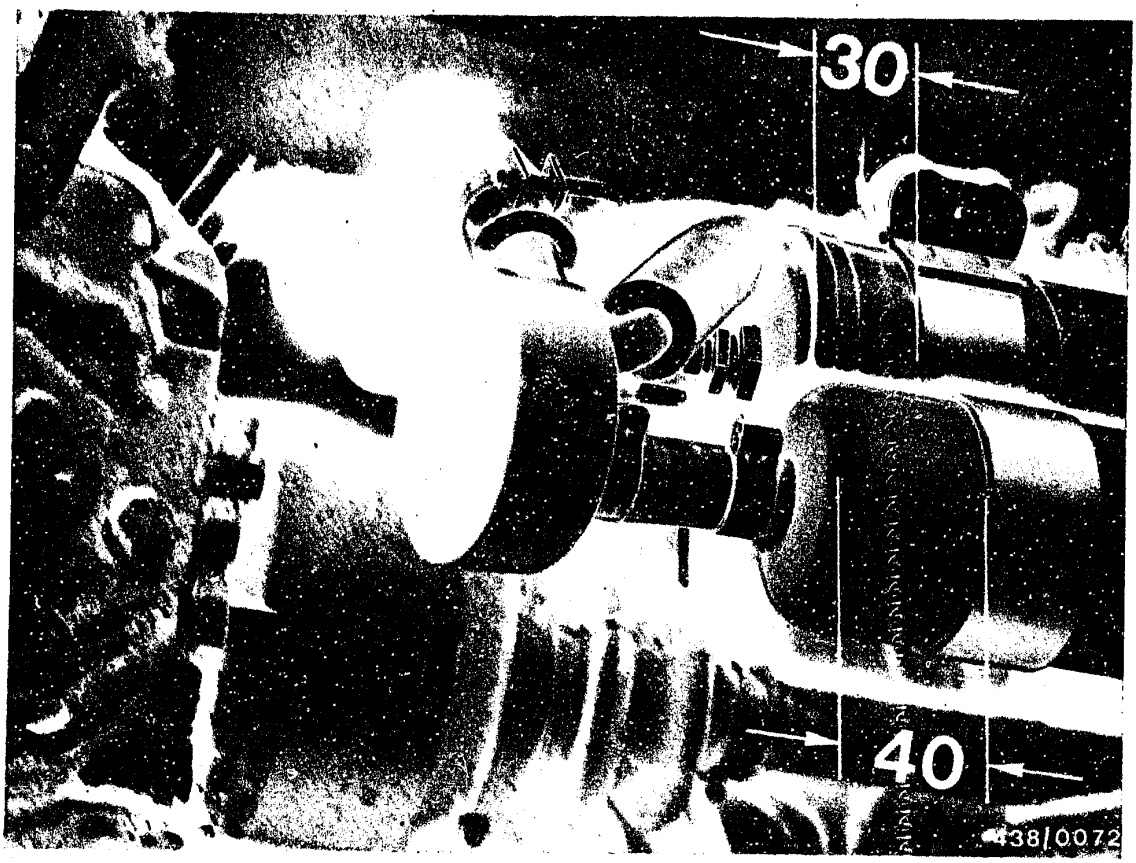
12.3 Test specification

Fuel delivery:

3.5 l engine	at least 1000 cm^3/30 s
4.5 - 6.9 l engine	at least 1100 cm^3/30 s

12.4 Possible causes of insufficient fuel delivery

- Power supply to the electric fuel pump defective.
- Voltage drop at the connection of the electric fuel pump.
  Minimum voltage with pump operating is 11.5 V.
- Fuel filter very dirty.



If these points are OK, replace the electric fuel pump.

To do this, pinch off the fuel intake hose from the fuel tank to the intake-noise damper (e.g. using hose clamper W 157 from Matra Co.).

When installing, pay attention to the correct position of the electric fuel pump (Fig.). Danger of bending the fuel lines.

12.5 Alterations in electric fuel pumps

As from November 1975, Daimler-Benz vehicles have been equipped with a new electric fuel pump with central fittings. The earlier model, which had a pressure connection piece on the side, is no longer available. Therefore, if the pump breaks down, it is necessary to replace it with the new model.

When changing over, remove the complete carrier with electric fuel pump, fuel filter, fuel accumulator and intake-noise damper.

Pinch off the fuel-intake hose from the fuel tank to the intake-noise damper (e.g. using hose clamper W 157 from Matra Co.).

Remove or pinch off electrical connections, intake hose from intake-noise damper, tubing from filter and accumulator.

Unscrew the carrier from the antivibration pads (4 nuts) and remove.

Loosen intake hose between damper and electric fuel pump - and connecting line to accumulator-spring chamber - and pull off. Unscrew tubing between electric fuel pump and filter at filter.

Unscrew both clamping screws on the supporting clamp and remove electric fuel pump.

Put in new electric fuel pump and put clamping screws on lightly.

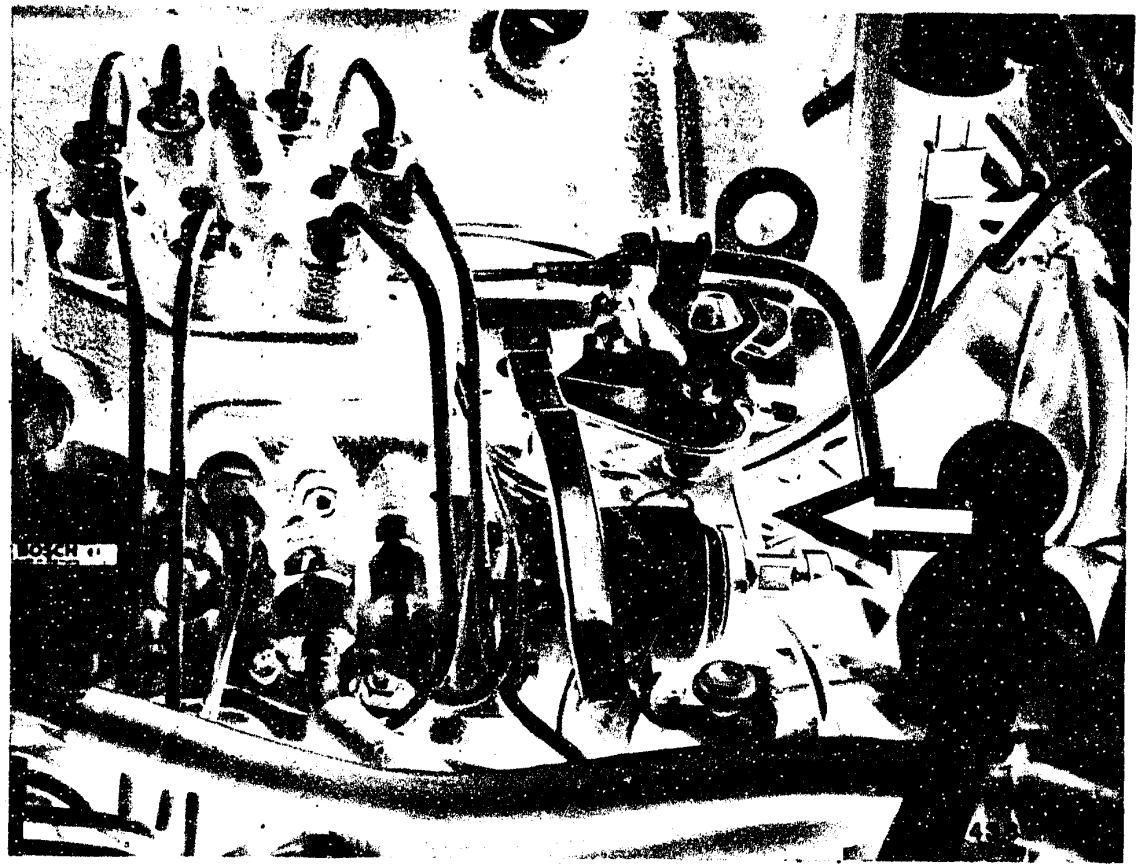
Until the model year 1977, the Daimler Benz Company used electric fuel pump 0 580 254 984.
This version has been replaced by 0 580 254 975.

Both electric fuel pumps operate in the same way, but they have different intake tubes. The new one has a diameter of 15mm and the old one 12 mm.
Thus the diameter of the fitting on the damper and of the fuel hose between the damper and the electric fuel pump had also to be changed.

The aim of this alteration was to ensure that the intake process remained the same under all climatic conditions.

The following are required for changing over:

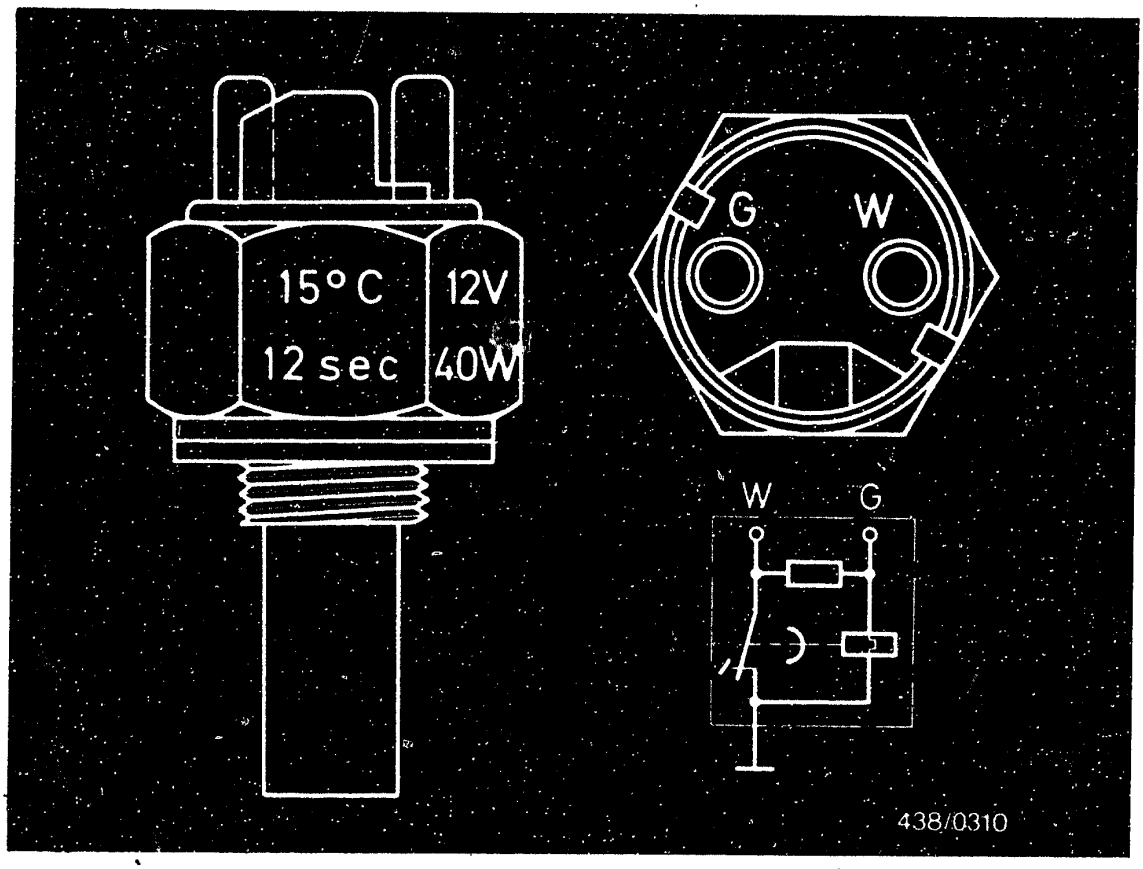
from Bosch:	Electric fuel pump	0 580 254 975
from Daimler Benz:	Damper holder	116 470 03 16
	Fuel hose approx. 50 mm long	107 476 01 26
	Hose clamp	91 6002 0211 00



13. Checking the cold-start system (thermo-time switch, cold-start valve).

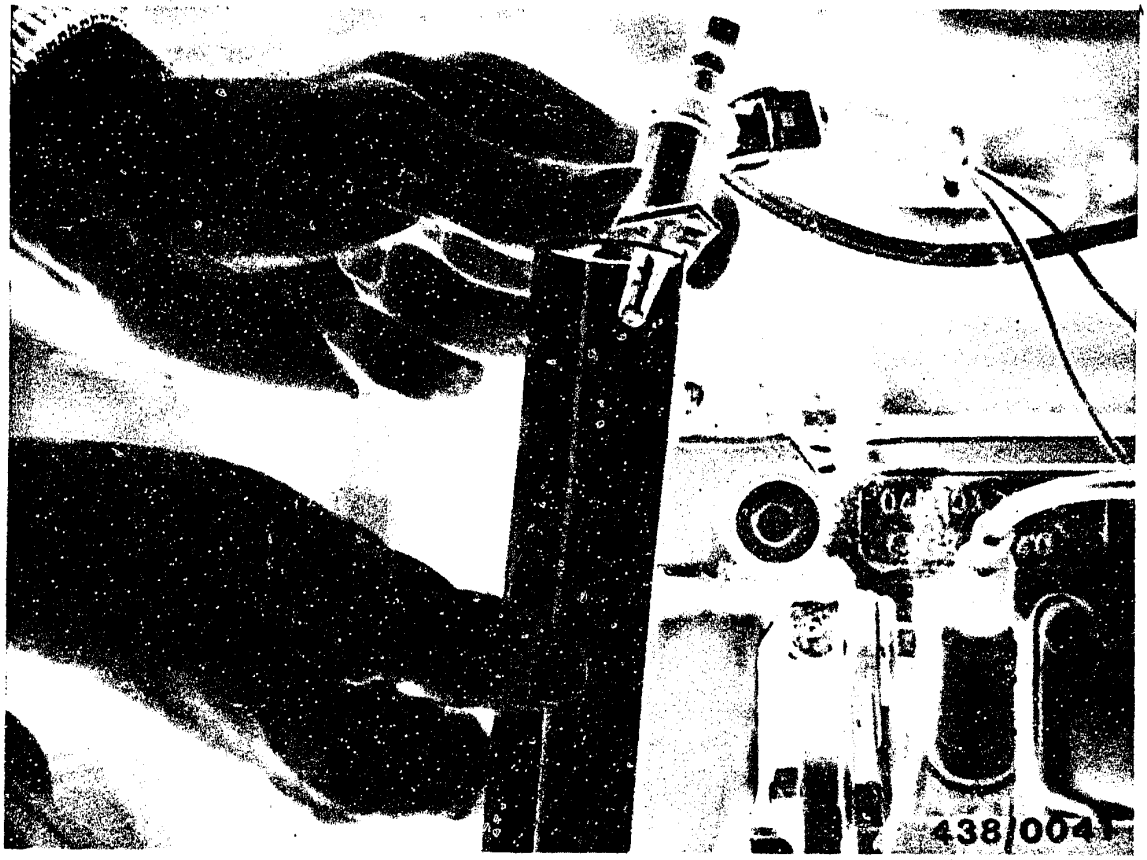
13.1 Thermo-time switch (arrow), (not a Bosch product)

Pull off the plug.
Remove the thermo-time switch for testing.
Collect any escaping coolant in a container.



The switching temperature +15°C and the switching time at -20°C of 12 seconds are stamped into the hexagonal section of the thermo-time switch.
The removed thermo-time switch is tested using the ohmmeter in accordance with the specifications given below. The temperatures for the thermo-time switch can easily be obtained with water. Cooling takes place in a freezer chest.

At a temperature below °C	above °C	Resistance measurement (Ω) between Term. "G" and "ground" (housing)	Term."W" and "ground" (housing)	Term. "G" and term. "W"
+10		40...60	0	40... 60
	+20	50...70	240...300	180...240



13.2 Start valve

Remove the start valve. Connect a hose line instead of the steel tubing.
Pull off the plug and connect the start valve directly to ground and to terminal 15 (e.g. at the ignition coil) using connecting cable KDJE 7450/70.

Important note:
During this test, do not let the connecting cable touch B +. Danger of fire due to sparking!

Hold the start valve in a suitable container (e.g. the graduate).
Switch on the electric fuel pump by bridging the safety circuit.
Switch on the ignition (max. 30 seconds). The start valve must now open and spray fuel.

Switch off the ignition, remove the electric connecting cable and dry the nozzle of the start valve.
The safety circuit remains bridged so that the primary pressure is applied to the start valve.
No droplets of fuel must drip from the nozzle of the start valve during the next minute. Even if shaken and knocked, the start valve must not leak.
Then switch the electric fuel pump off again.
Replace the start valve if it does not open or if it leaks.

If a leaky start valve or a defective thermo-time switch has been replaced, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.
Idle-speed adjustment is described on Coordinate F18.

14. Checking the control pressures

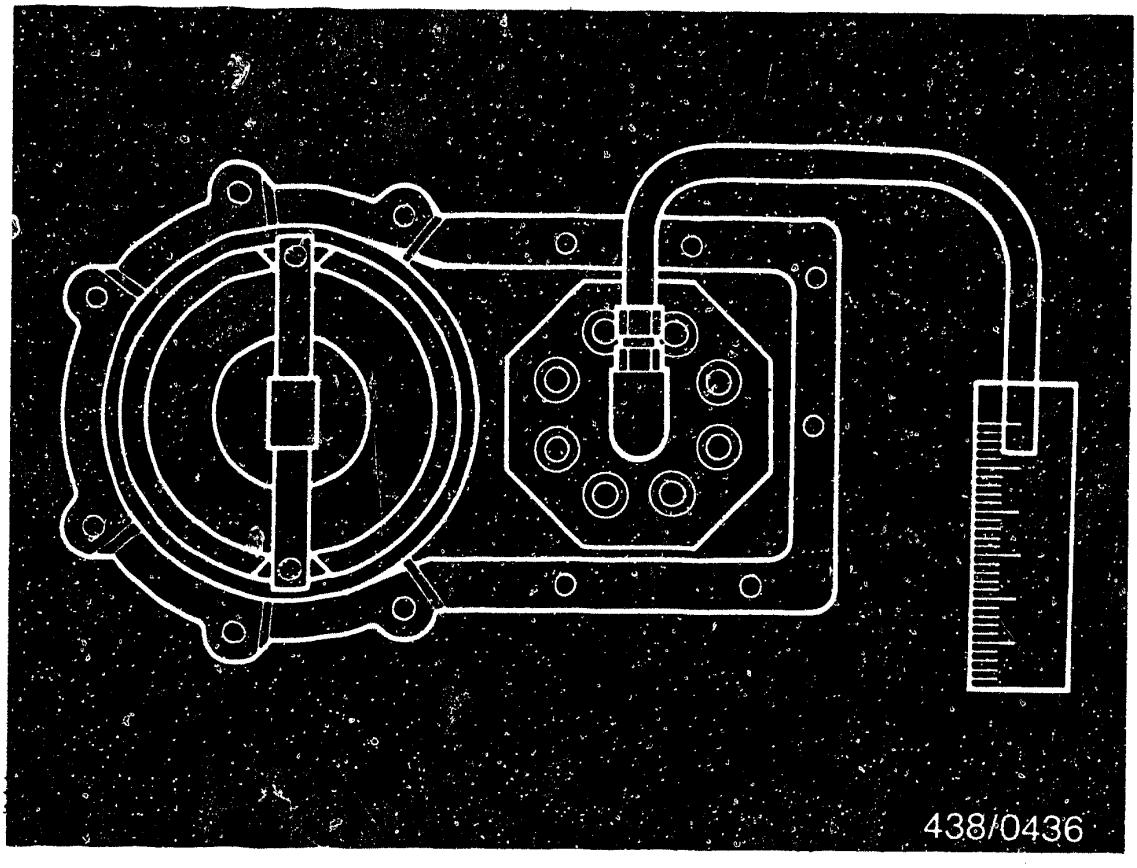
14.1 Preliminary remarks:

The control pressures tested in the following are in each case governed by the warm-up regulator.

If the test results are incorrect, however, this may also be due to faults which have nothing to do with the warm-up regulator.

These possible faults are:

- No or too low a voltage at the electric connector.
- Fuel return from the warm-up regulator blocked or constricted.
- Too high a fuel delivery for the control-pressure circuit.
  The testing of this control-pressure delivery is described as an additional test step at the beginning of the control pressure tests.
  Test specification: 160...240 cm^3/min.
  Reference is made to the other possible causes of trouble in the respective test step.



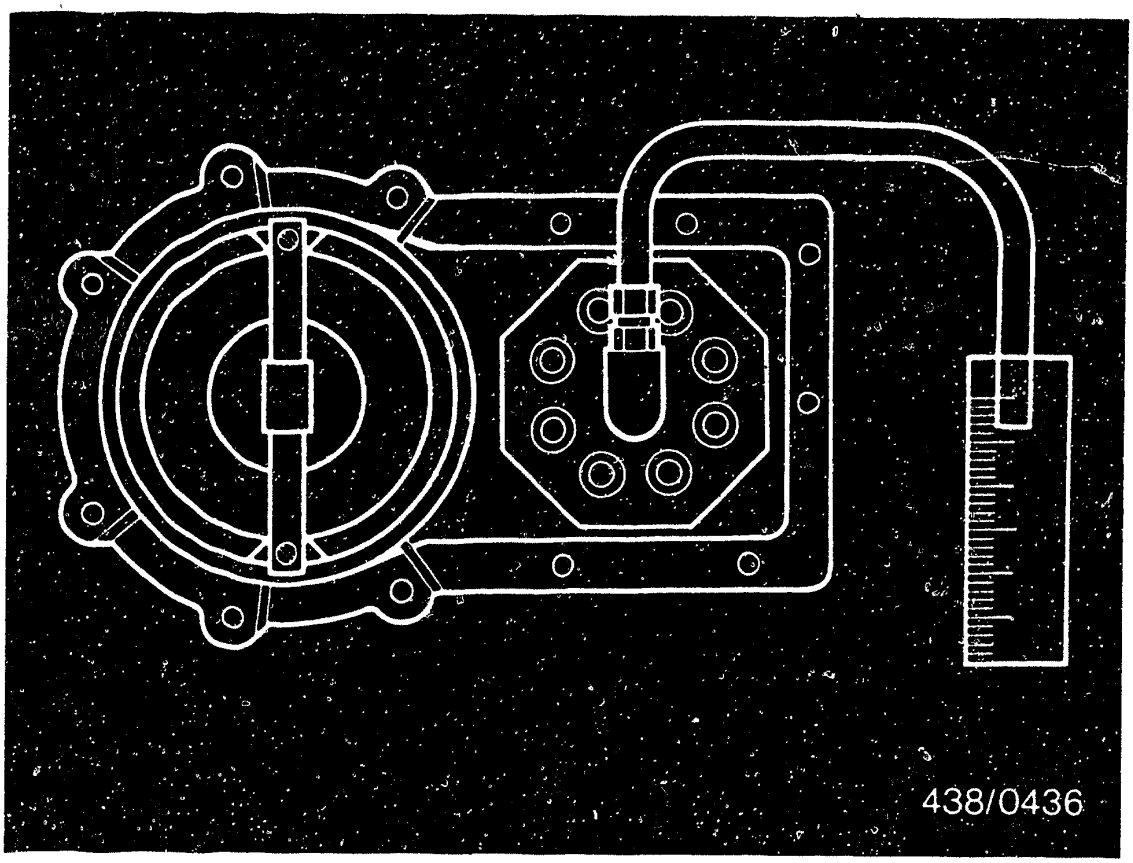
14.2 Checking the fuel delivery for the control-pressure circuit:

Test requirements: The electric fuel pump must be operating properly.
Test specification:

3.5 l engine	at least 1,000 cm^3/30 s
4.5, 6.5 l engine	at least 1,100 cm^3/30 s

Unscrew the control-pressure line (to the warm-up regulator) from the fuel distributor.

Connect the connecting hose KDJE-P 100/11/1 (previously KDEP 1034/11/1) of the pressure tester to the control-pressure port of the fuel distributor and hold hose in a graduate (approx. 0.5 litre capacity).

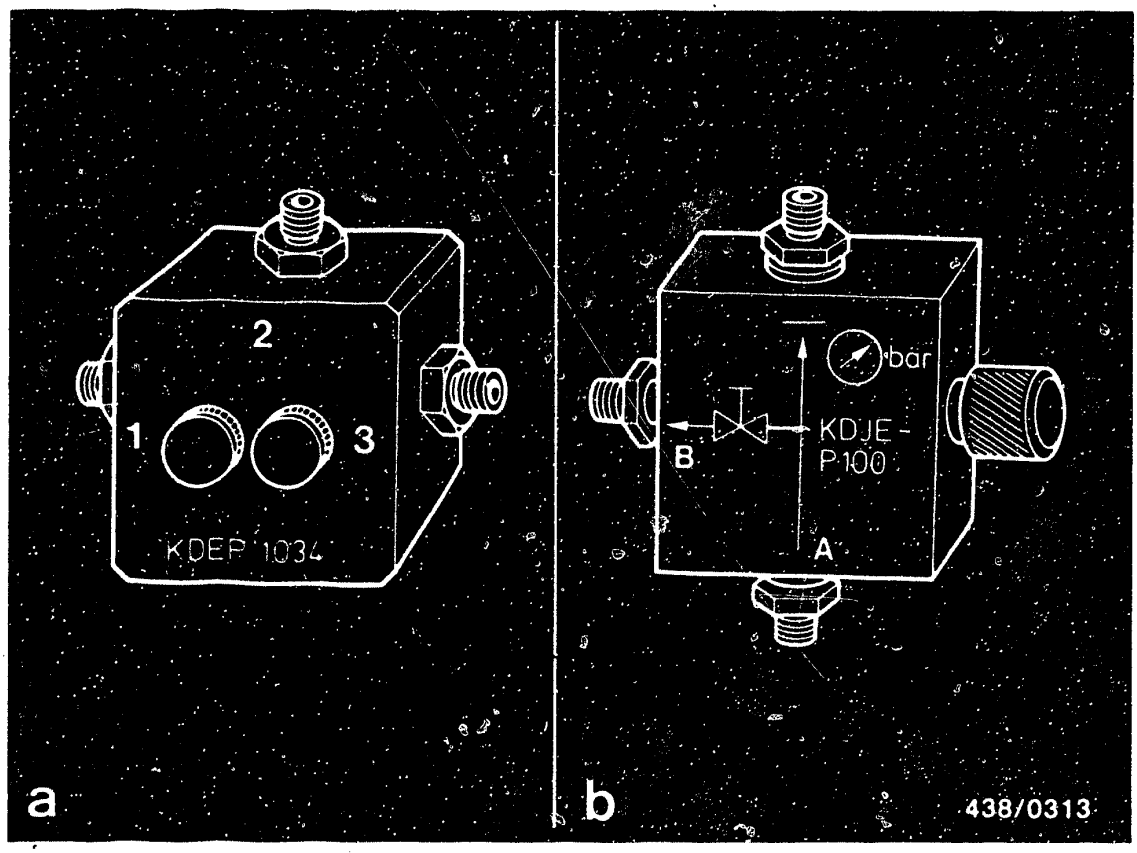


Switch on the electric fuel pump for 1 minute by bridging the safety circuit.
Measure delivery.

Test specification: 160...240 cm^3/min.

If the measured value is outside tolerance, the fault is in the fuel distributor.

Replace the fuel distributor.

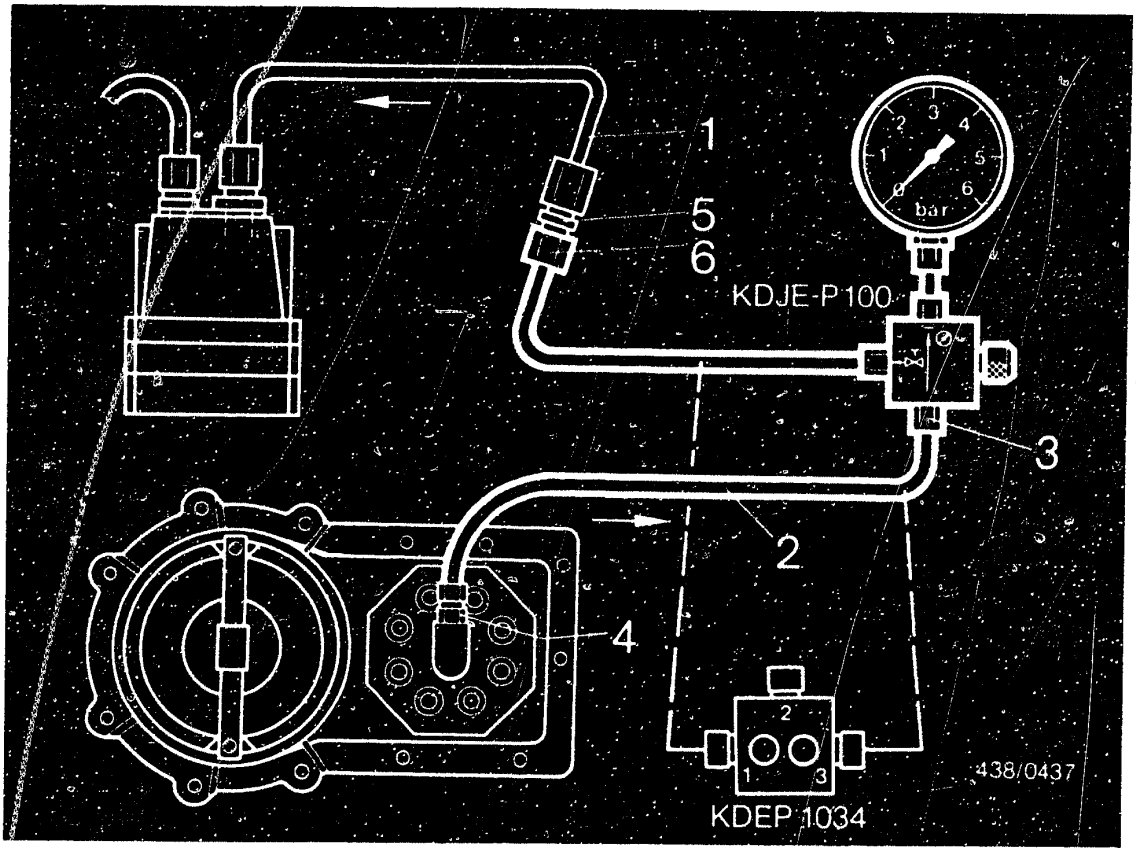


14.4 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a). Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:

A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

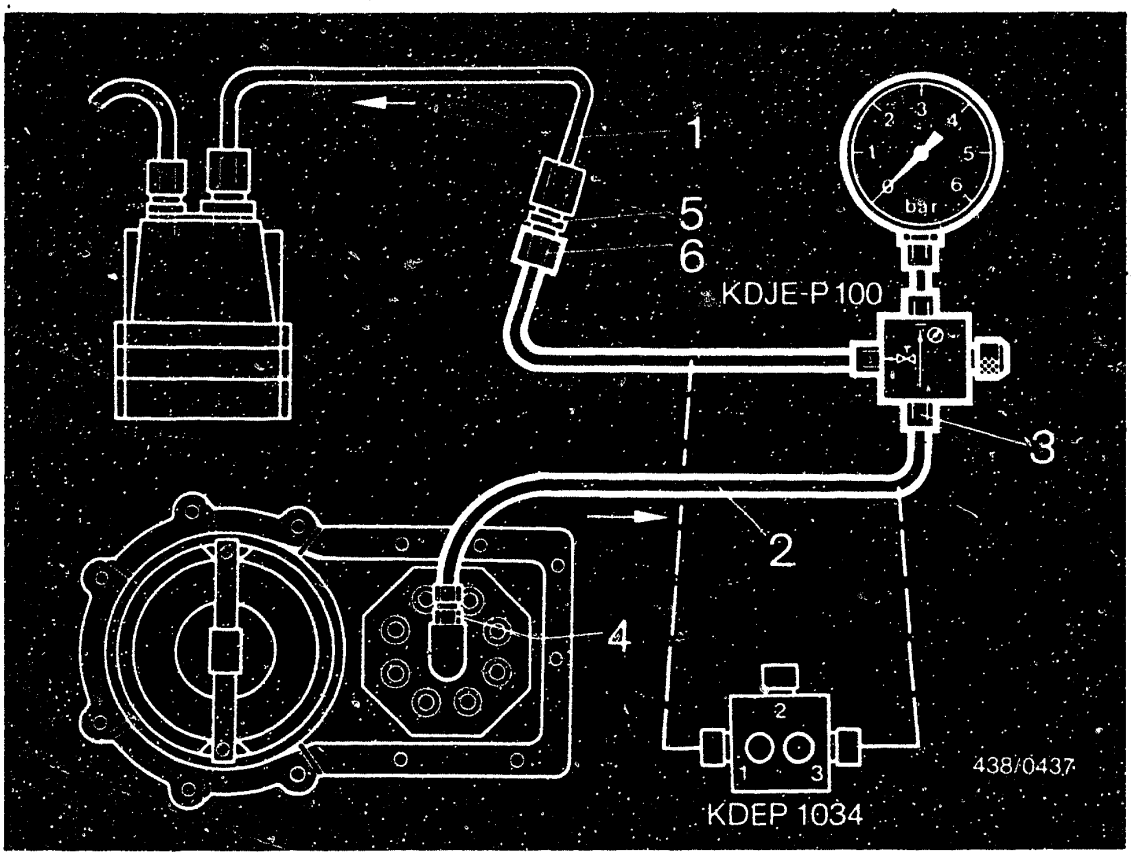
Caution:
When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

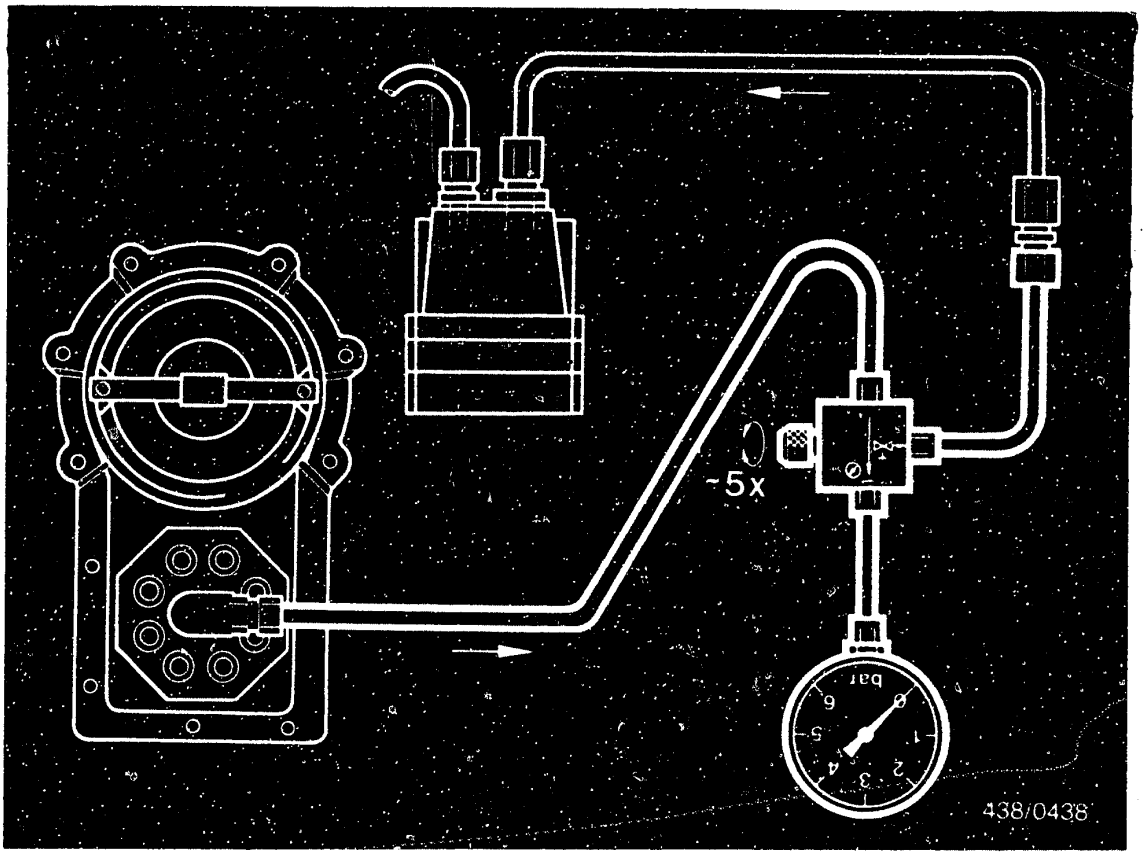
Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.



Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).

Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).

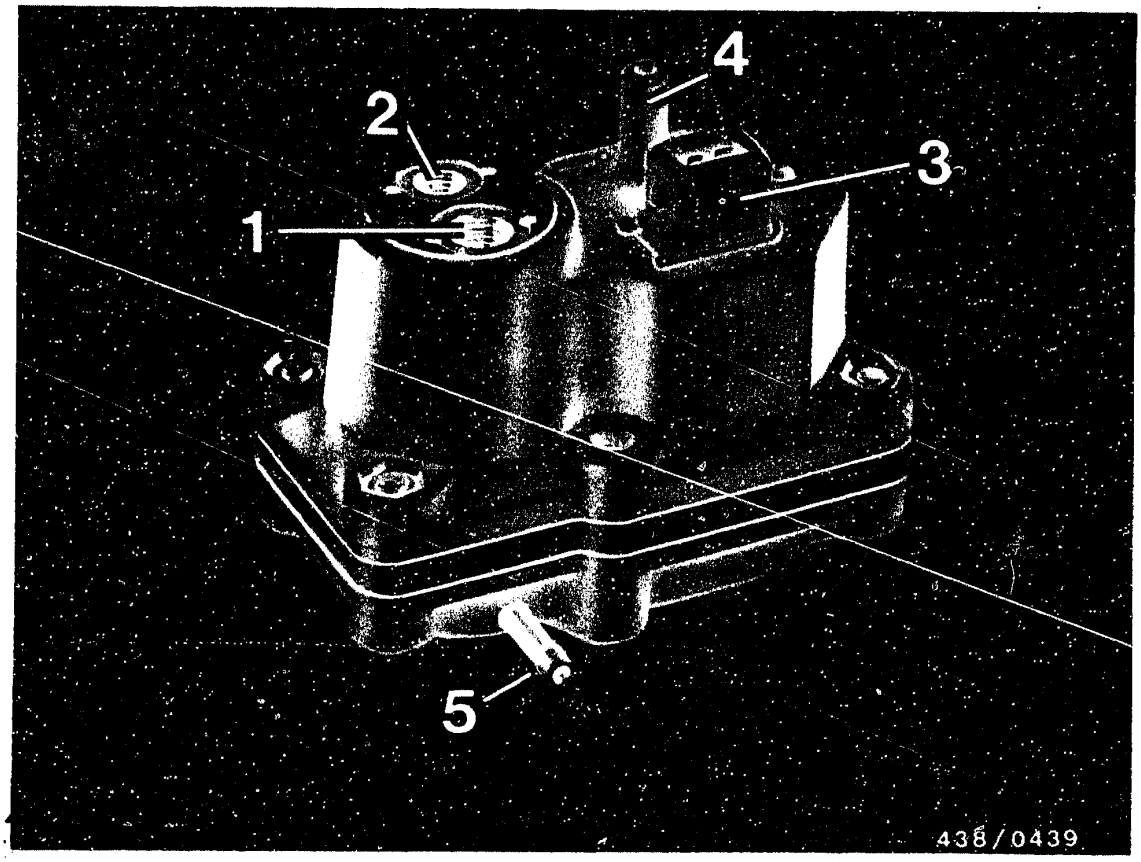


14.4 Bleeding the pressure tester

Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hand down (hose fully extended). Switch on the electric fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood). Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).

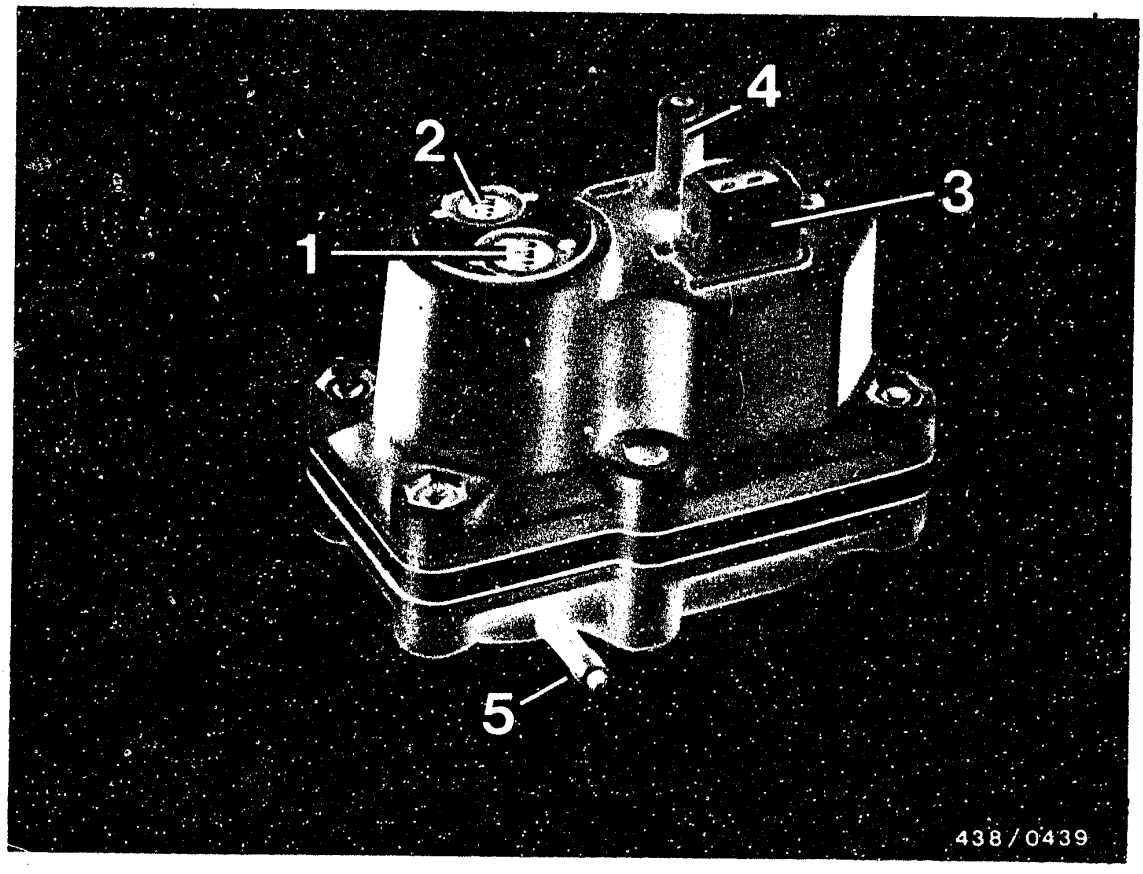


1 = Intake port (M 10x1)
2 = Return port (M 8x1)
3 = Electrical connection
4 = Manifold-pressure connection
5 = Connection to atmosphere

14.5 Checking control pressure

Warm-up regulators 0 438 140 010
0 438 140 028
0 438 140 056

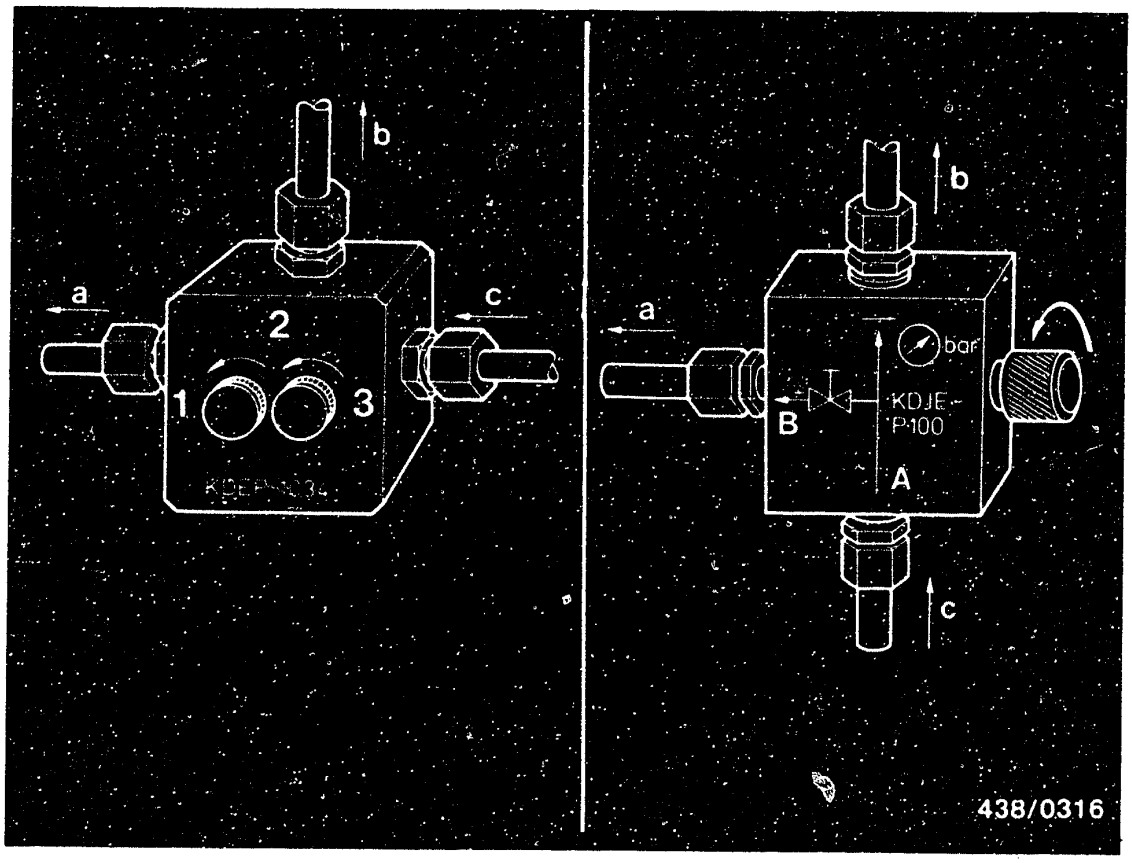
(Versions for manifold-pressure controlled full-load enrichment).



1 = Intake port (M 10x1)
2 = Return port (M 8x1)
3 = Electrical connection
4 = Manifold-pressure connection
5 = Connection to atmosphere

The cold and warm control pressures are additionally affected by the manifold pressure on the full-load diaphragm of the warm-up regulator.

The manifold-pressure connection is situated on the upper side of the housing cover. A connection pipe for the connection to the atmosphere (connection on the engine before the throttle valve) is housed in the base plate.

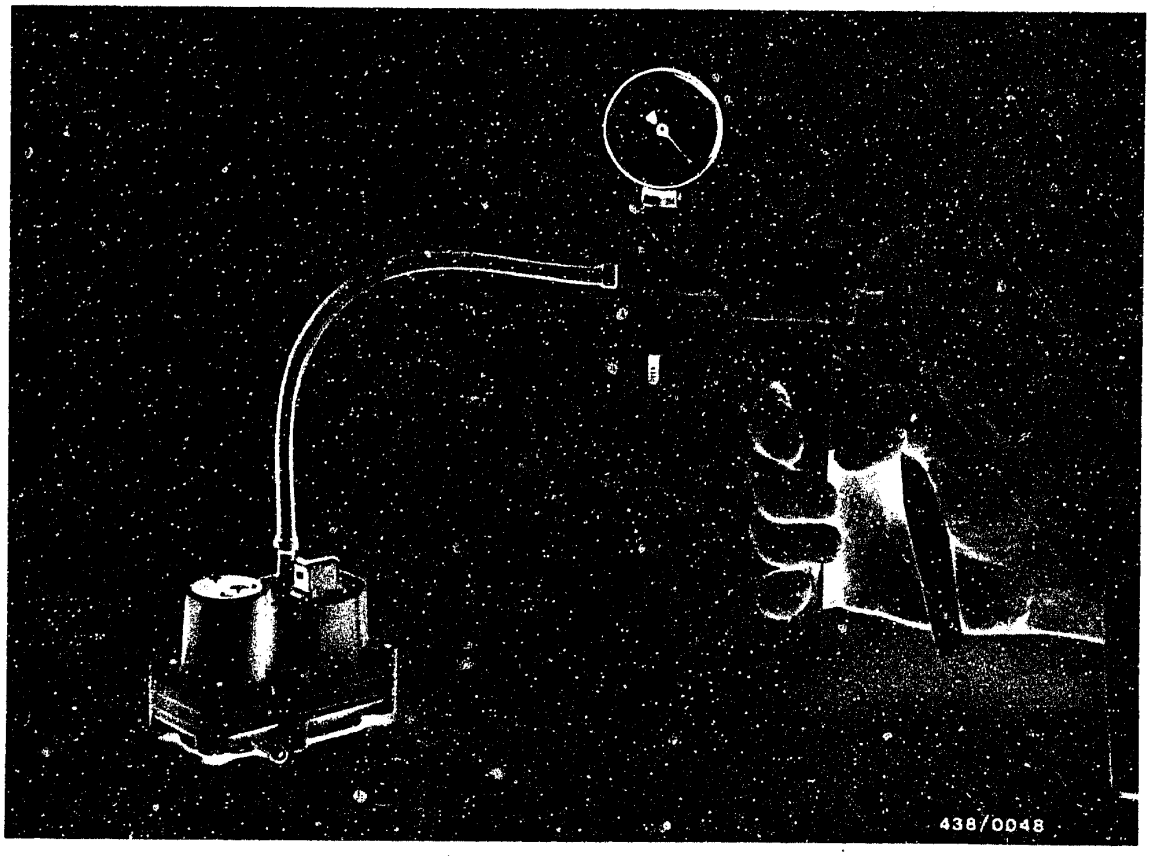


a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

14.6 Testing the "cold" control pressure

The test is performed with the engine switched off. The engine must be cold. For this purpose, the engine should have been switched off for several hours, preferably overnight.

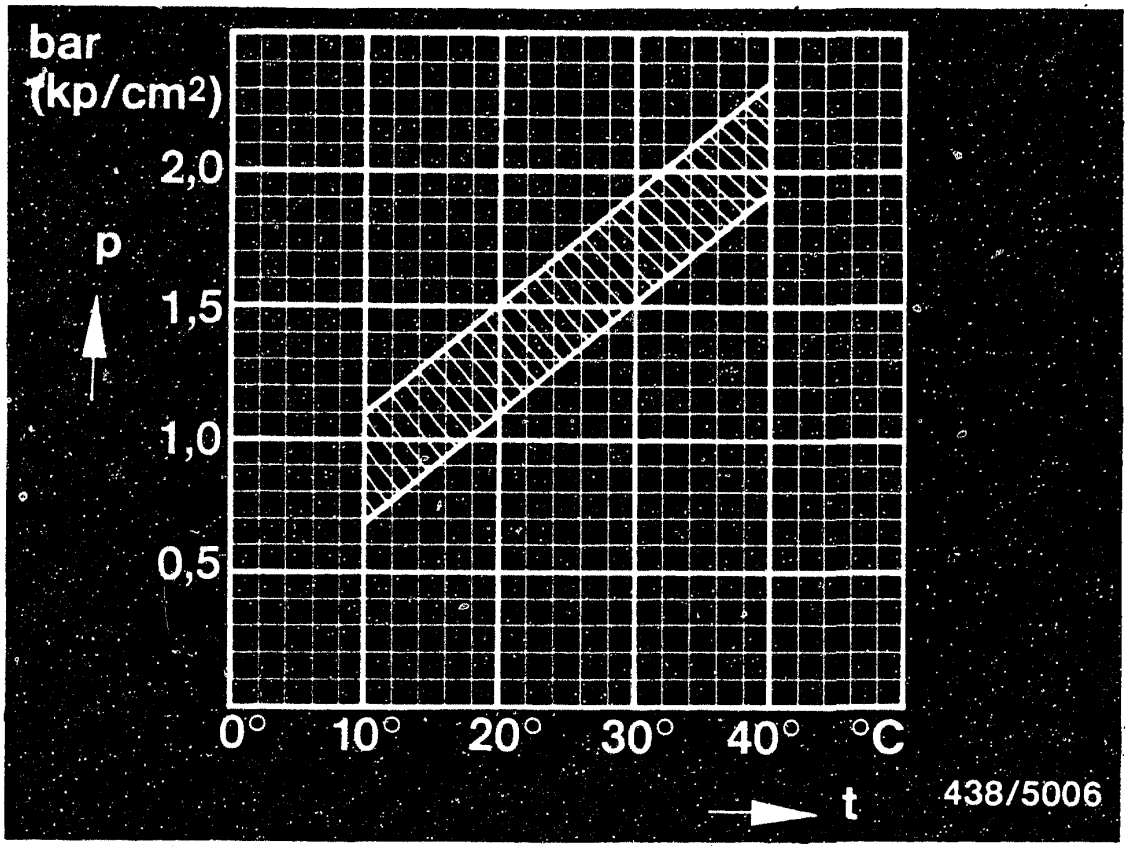
Pull off the plug from the warm-up regulator.
Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).
Switch on the electric fuel pump by bridging the electrical safety circuit.



This test requires a vacuum pump with a pressure gauge. It is connected to the manifold-pressure connection of the warm-up regulator.

The picture shows the test being carried out with the recommended "Mityvac" vacuum hand pump.

Setting value: 510...550 mbar
(385...415 mm Hg)



p = Control pressure (bar or kgf/cm² gauge pressure)
t = Ambient temperature (°C)

Warm-up regulator Part No.: 0 438 140 010
0 438 140 028

The pressure gauge of the pressure tester indicates the "cold" control pressure.
Calculate the nominal control pressure in accordance with the ambient temperatures in the graph.

Example: Ambient temperature = 20°C
Nominal control pressure = 1.0...1.5 bar gauge pressure

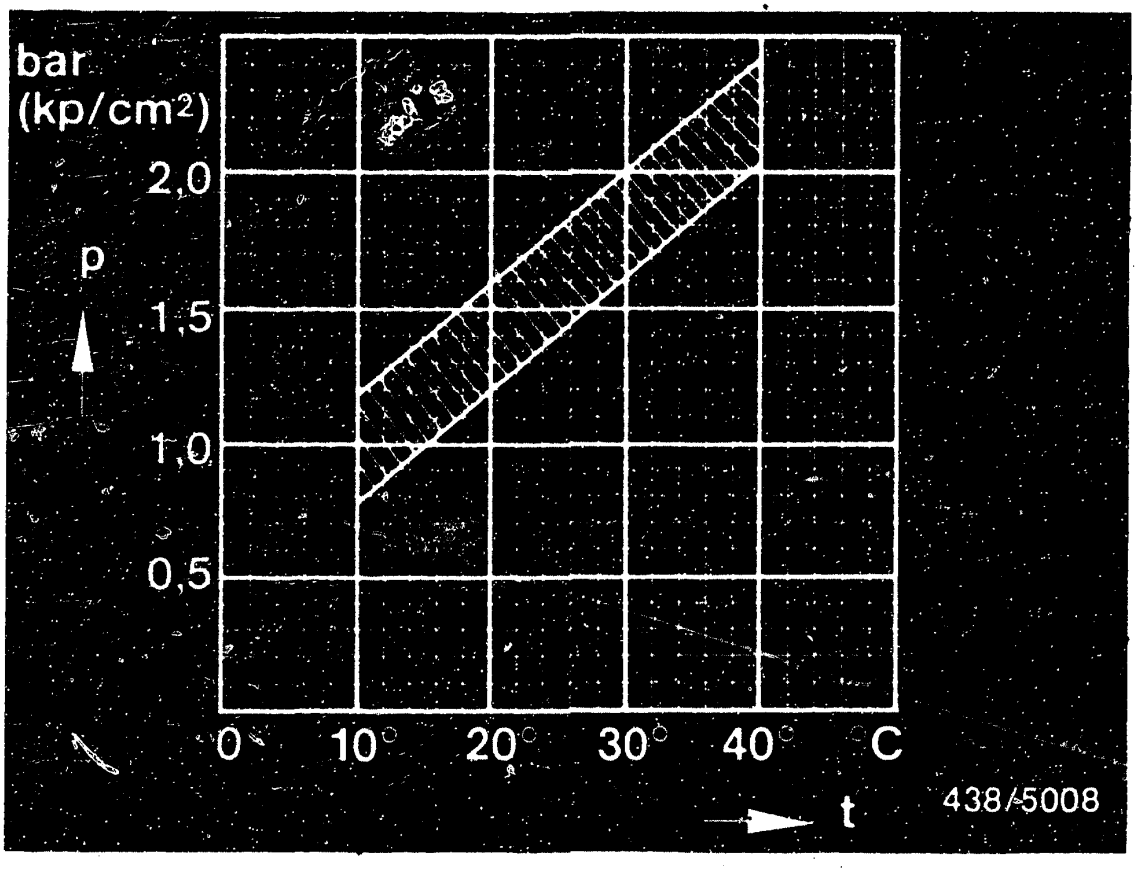
If the measured "cold" control pressure differs from the nominal value, this may be due to one of the following faults:

- Fuel delivery for the control-pressure circuit too low or too high. Test fuel delivery.
  Test specification: 160...240 cm^3/min.

- Fuel return from the warm-up regulator blocked or constricted (if control pressure too high).
  Eliminate constriction.

- Warm-up regulator defective. Replace warm-up regulator.

If the warm-up regulator breaks down due to dirt, then the new warm-up regulator should be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).



p = Control pressure (bar or kgf/cm² gauge pressure)
t = Ambient temperature (°C)

Warm-up regulator Part No.: 0 438 140 056

The pressure gauge of the pressure tester indicates the "cold" control pressure.
Calculate the nominal control pressure in accordance with the ambient temperatures in the graph:

Example: Ambient temperature = 20°C
Nominal control pressure = 1.2...1.6 bar gauge pressure

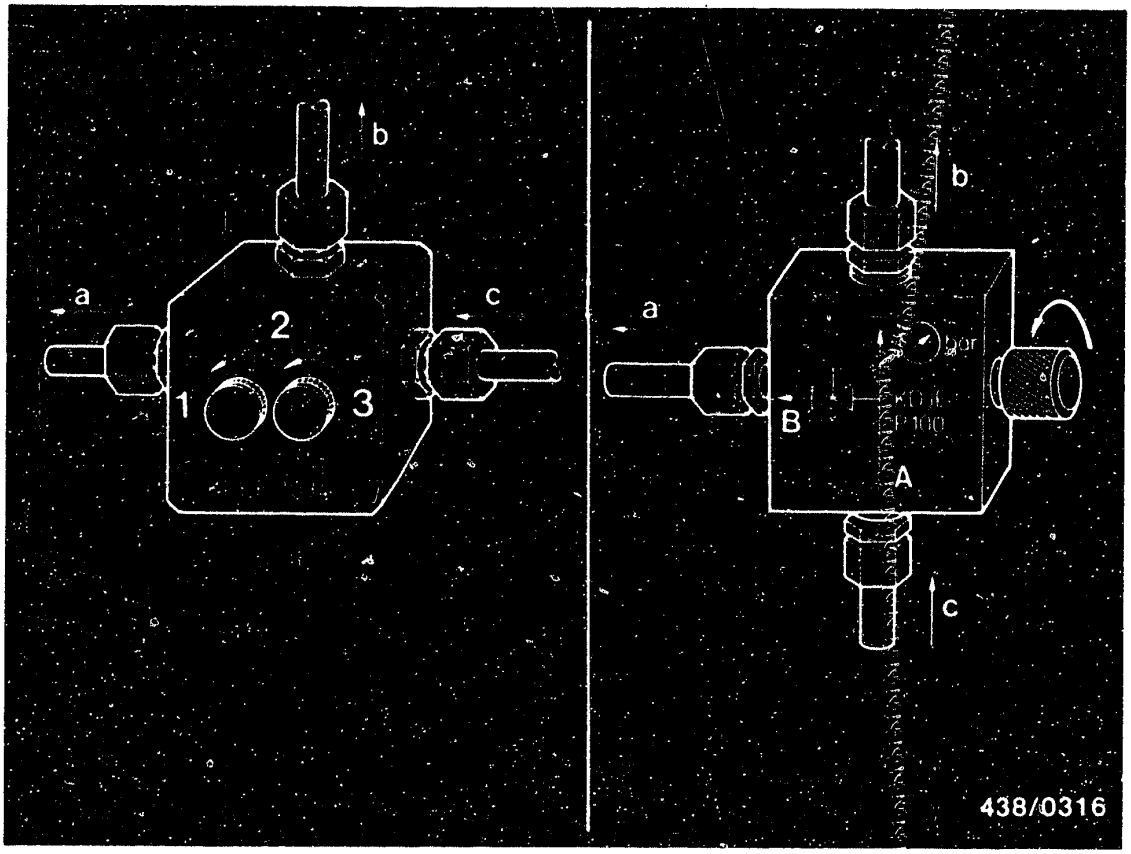
If the measured "cold" control pressure differs from the nominal value, this may be due to one of the following faults:

- Fuel delivery for the control-pressure circuit too low or too high. Test fuel delivery.
  Test specification: 160...240 cm^3/min.

- Fuel return from the warm-up regulator blocked or constricted (if control pressure too high).
  Eliminate constriction.

- Warm-up regulator defective. Replace warm-up regulator.

If the warm-up regulator breaks down due to dirt, then the new warm-up regulator should be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

14.7 Checking the "warm" control pressure

The test is carried out with the engine switched off, once with atmospheric pressure and once with simulated intake-manifold vacuum at the full-load diaphragm.

Test procedure:

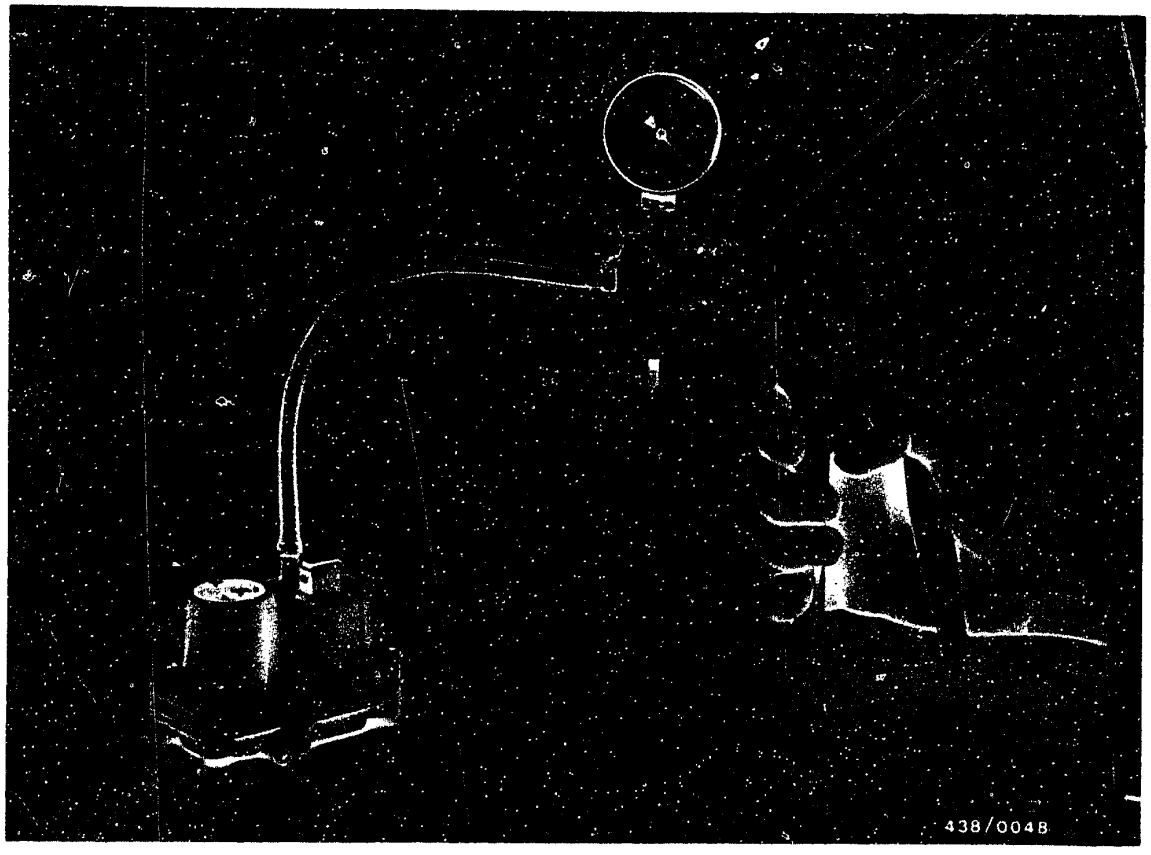
Temperature of engine not important.

Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Attach the plug to the warm-up regulator.

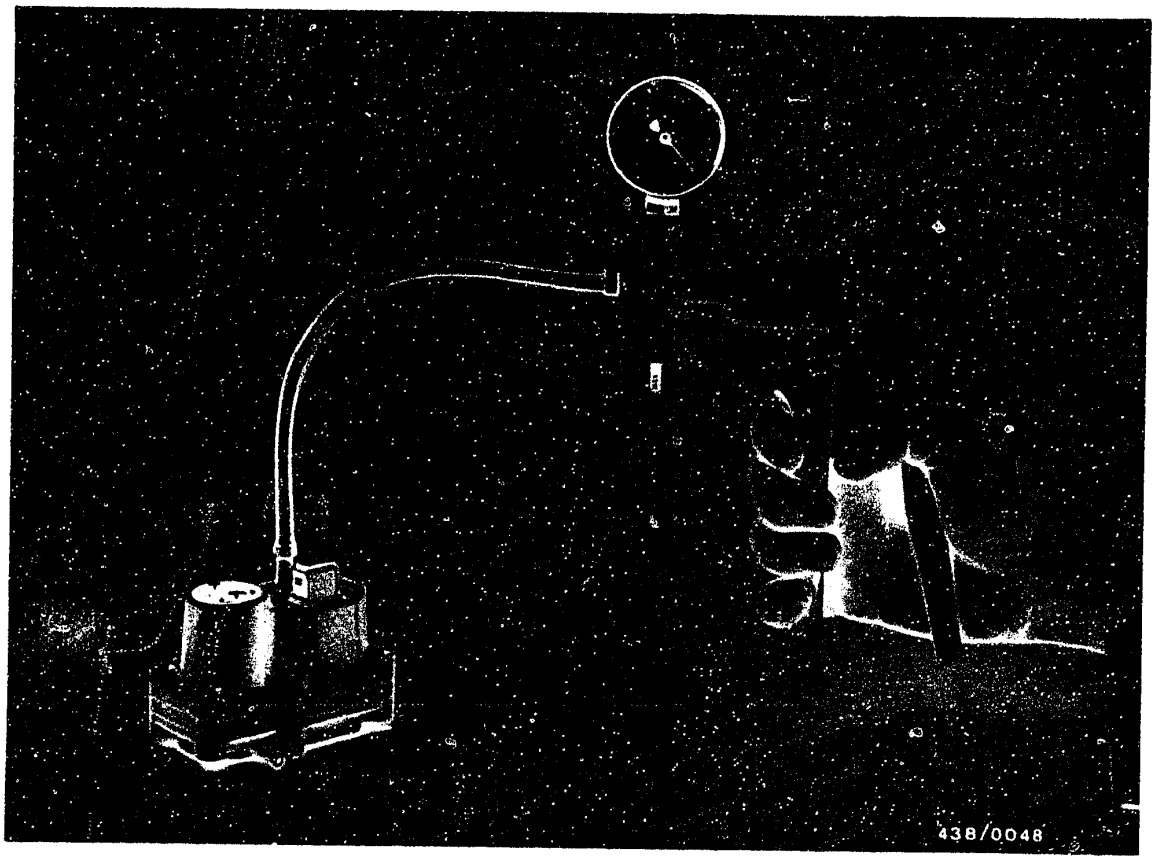
Control pressure now rises (the warm-up regulator in the process of shutting off) until the "warm" control pressure is reached.



A vacuum pump with pressure gauge is required for this test. It is connected to the manifold-pressure connection of the warm-up regulator.
The picture shows the test being carried out with the recommended "Mityvac" vacuum hand pump.

Setting value: 510...550 mbar
(385...415 mm Hg)

The pressure gauge of the pressure tester shows the "warm" control pressure.



Test specification "warm" control pressure (with manifold pressure):

Warm-up regulator Part No.:
0 438 140 010 }
0 438 140 028 }
0 438 140 056 }

3.4...3.8 bar
(3.5...3.9 kgf/cm²) gauge pressure

Test specification "warm" control pressure (with atmospheric pressure):

Warm-up regulator Part No.:
0 438 140 010 } 2.8...3.2 bar
0 438 140 056 to FD 930} (2.9...3.3 kgf/cm²) gauge pressure

0 438 140 056 from FD 931 2.6...3.0 bar
(2.7...3.1 kgf/cm²) gauge pressure

0 438 140 028 2.5...2.9 bar
(2.6...3.0 kgf/cm²) gauge pressure

If the measured "warm" control pressure differs from the test specification, this may be due to one of the following faults:

If control pressure too high:

- Fuel delivery for the control-pressure circuit too high. Test fuel delivery. Test specification: 160...240 cm^3/min.

- Fuel return from the warm-up regulator blocked or constricted.
  Eliminate constriction.

- Warm-up regulator has hydraulic defect.
  Replace warm-up regulator.

If control pressure too low:

- Power supply open-circuit.
  Eliminate open circuit. Ensure that the plug is contacting properly.

- Battery voltage too low, voltage drop.
  Eliminate voltage drop. Minimum voltage at connector: 11.5 V.
  If necessary, repeat test with engine running in order to obtain the normal generator voltage of approx. 14 V when the vehicle is in operation.

- Fuel delivery for the control-pressure circuit too low.
  Test fuel delivery. Test specification: 160...240 cm^3/min.

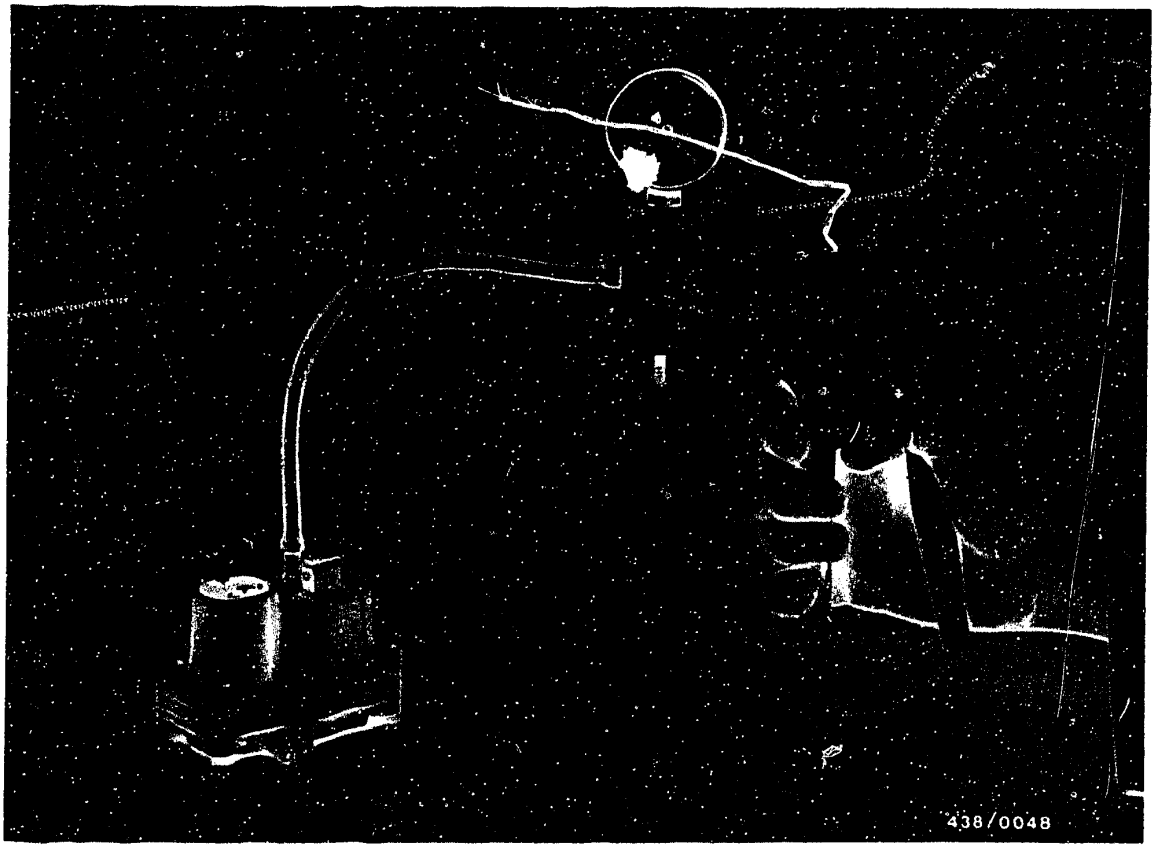
- Vacuum hose from intake manifold to warm-up regulator loose or faulty. If necessary, replace hose. When testing with the vacuum pump, this hose should also be tested and, if necessary, replaced.

- Warm-up regulator defective. Heating coil open-circuit.
  Hydraulic defect.

- Replace warm-up regulator.

If the warm-up regulator has been replaced or if a defect has been eliminated, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinates F 18.



14.8 Testing the full-load diaphragm for leaks

Switch off the electric fuel pump.

Connect the "Mityvac" vacuum hand pump to the manifold-pressure connection of the warm-up regulator and generate a vacuum.

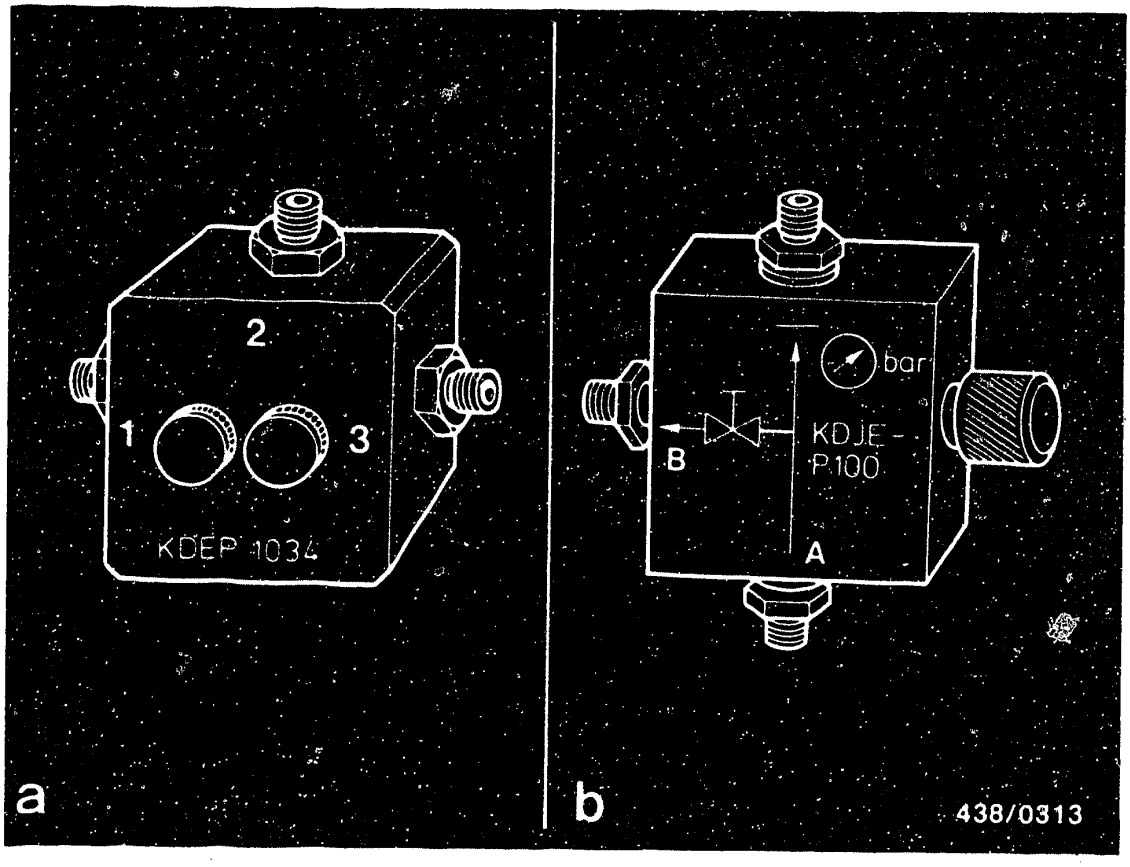
Setting value: 510...550 mbar
(385...415 mm Hg)

Test specification pneumatic sealing:
Max. pressure drop within 15 s 100 mbar (75 mm Hg)

If the pressure fall is too great, replace the warm-up regulator.

If the warm-up regulator has been replaced or a defect in the control-pressure circuit has been eliminated, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinates F 18.



15. Testing and adjusting the primary (system) pressure:

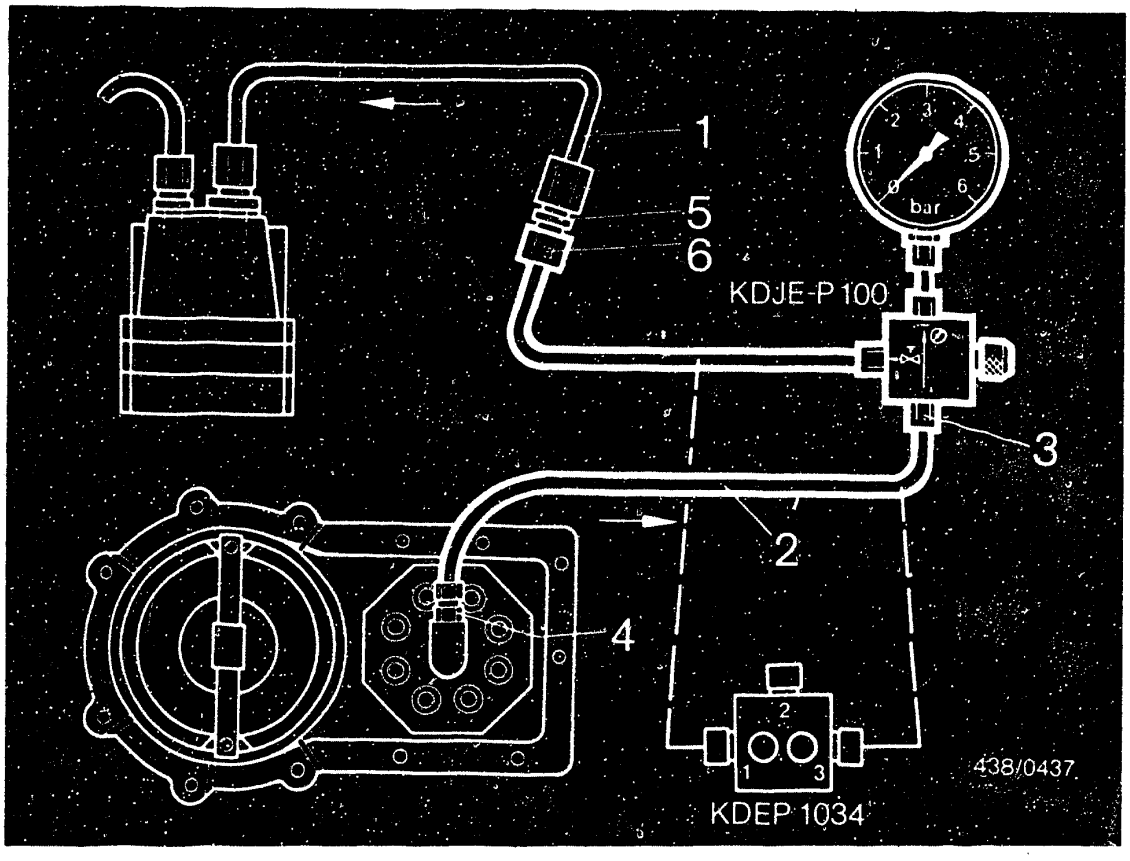
15.1 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a).

Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:

A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

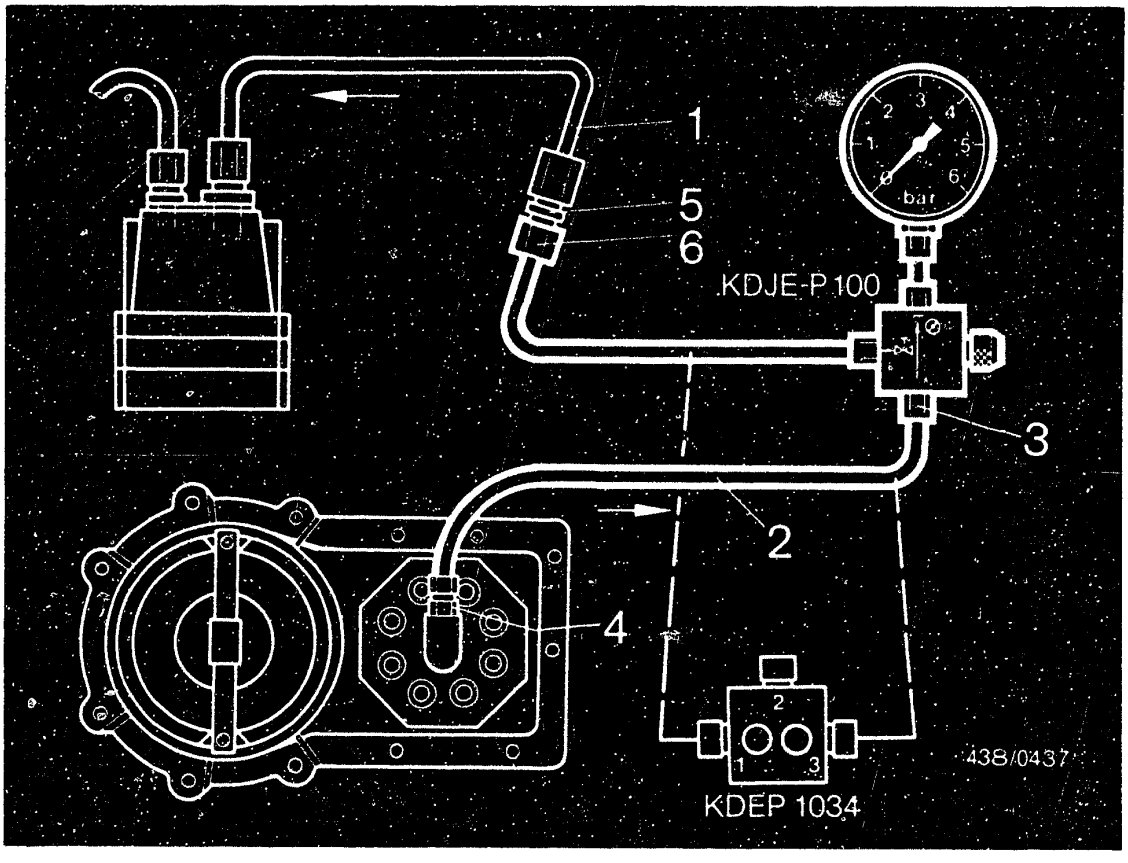
Caution:
When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

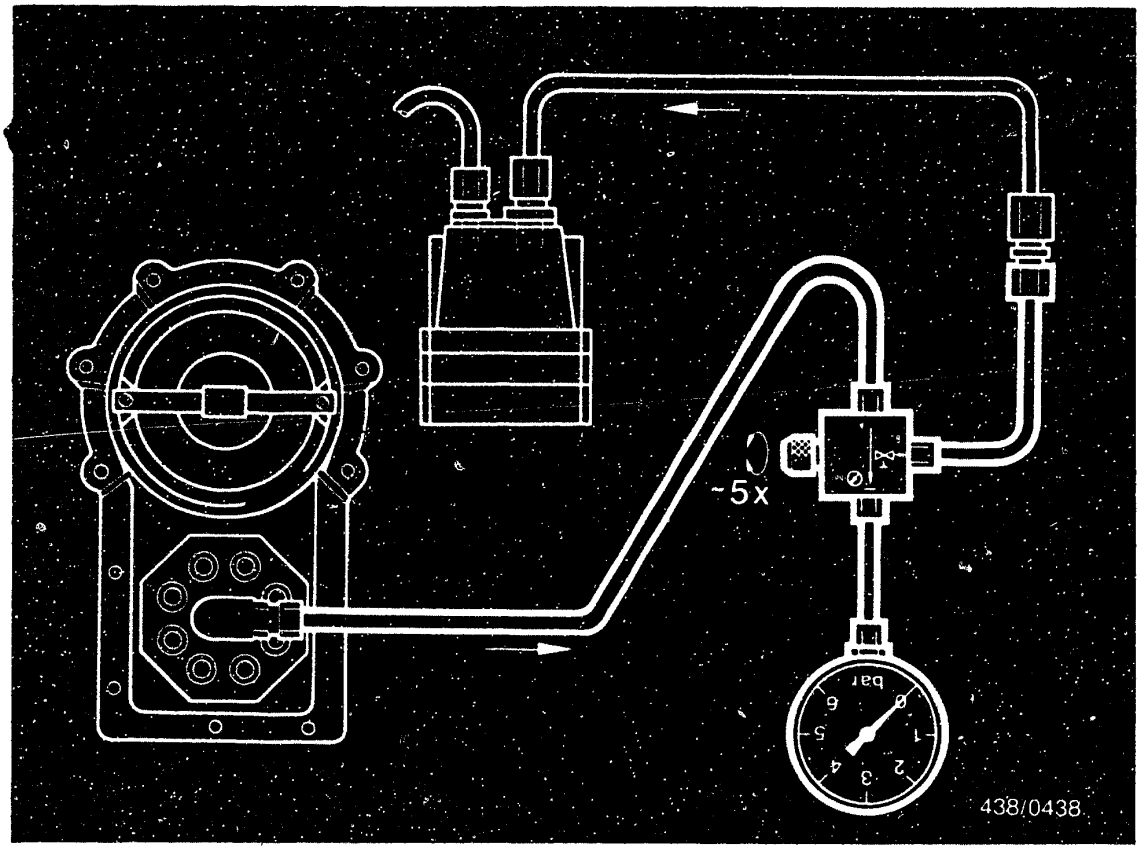
Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.



Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).

Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).

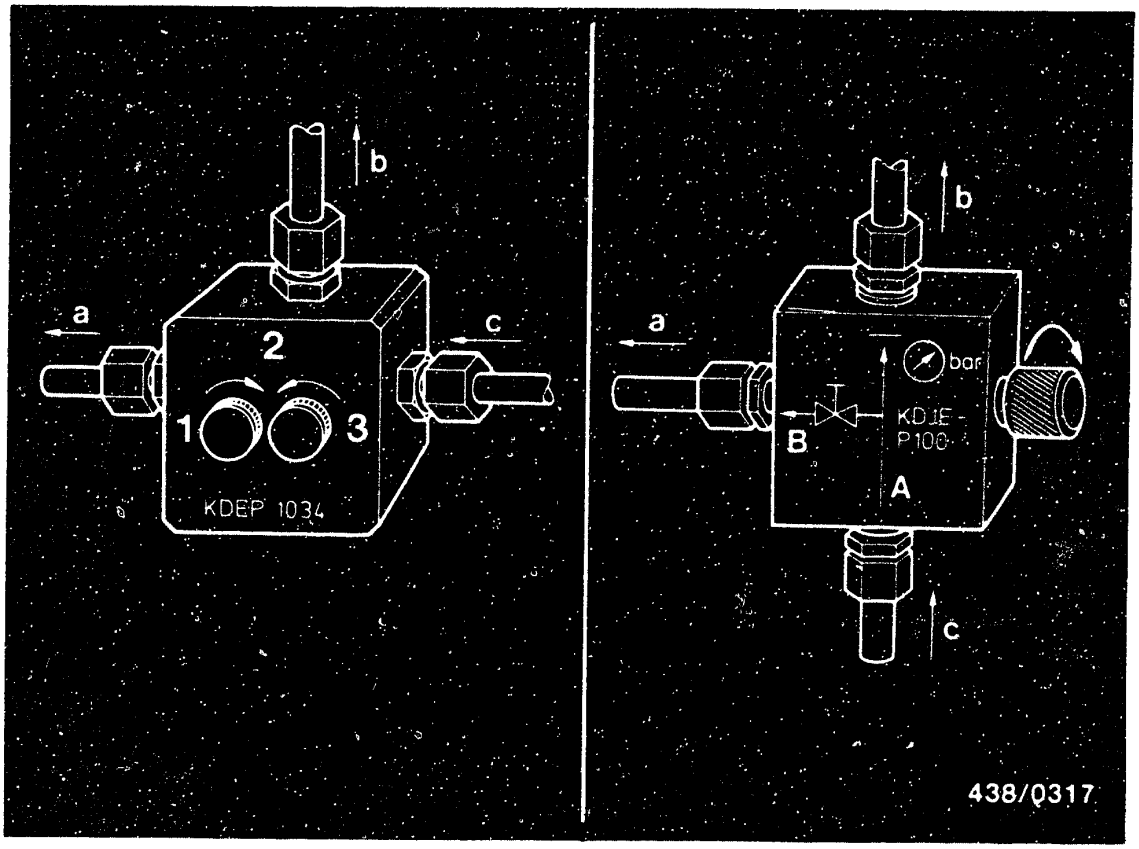


15.2 Bleeding the pressure tester

Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hang down (hose fully extended). Switch on the electrical fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood). Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

15.3 Testing the primary pressure:

The test is performed with the engine switched off.
The temperature of the engine is not important.
Close the valve screw of directional-control valve KDJE-P100.
In the case of KDEP 1034, close valve screw 1, open valve screw 3.

Switch on the electric fuel pump by bridging the electrical safety circuit.
The pressure gauge now indicates the primary pressure.

Fuel distributor Part No.	Test specifications - primary pressure
0 438 100 012 0 438 100 034 }	5.2...5.8 bar (5.3...5.9 kgf/cm²) gauge pressure

Possible causes for too low a primary pressure:

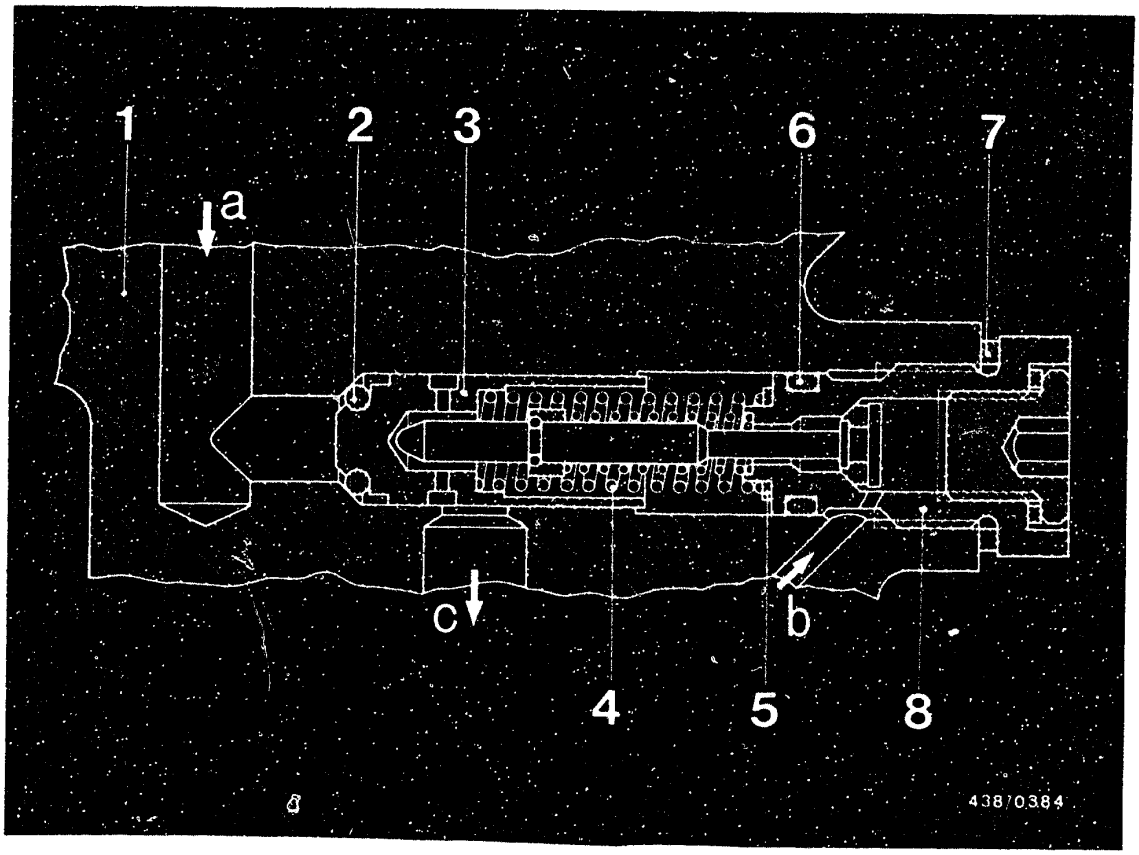
- Fuel supply faulty.
  (Delivery of electric fuel pump too low).

- Primary pressure set incorrectly.
  A precondition for readjustment of the primary pressure is always that the fuel supply is in order.
  Measure the fuel delivery.
  Test specifications: 3.5 l engine min.1000 cm³/30 s
  4.5 l
  6.9 l engine } min.1100 cm³/30 s

Possible causes for too high a primary pressure:

- A restriction in the return line leading to the fuel tank.

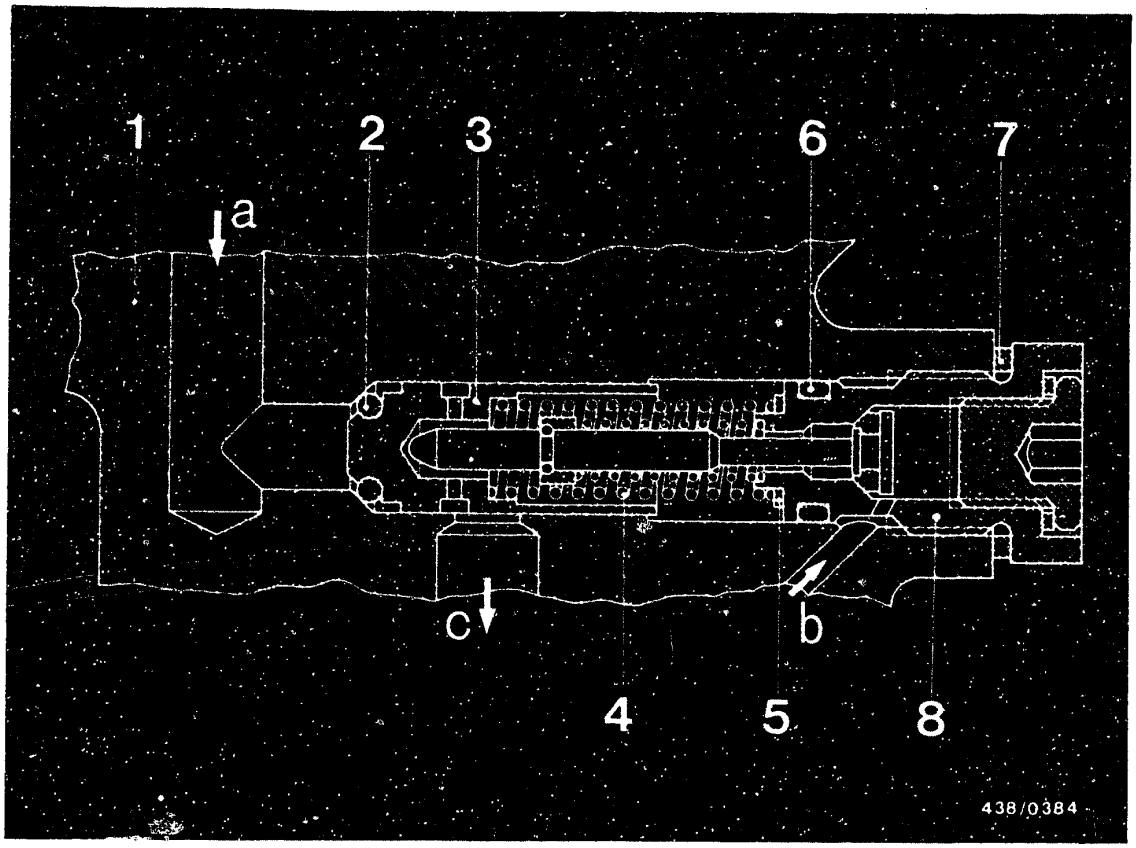
- Primary-pressure regulator set incorrectly.
  For this reason, before readjusting too high a primary pressure, always first check the condition of the return line leading to the fuel tank.



a = Primary pressure
b = From warm-up regulator
c = Fuel return
1 = Fuel-distributor housing
2 = O-ring
3 = Control piston
4 = Control spring
5 = Shim(s)
6 = O-ring
7 = Flat seal ring
8 = Screw plug

15.4 Adjusting the primary pressure:

Fuel distributor Part No.	Adjustment values - primary pressure
0 438 100 012 0 438 100 034	5.3...5.5 bar (5.4...5.6 kgf/cm²) gauge pressure



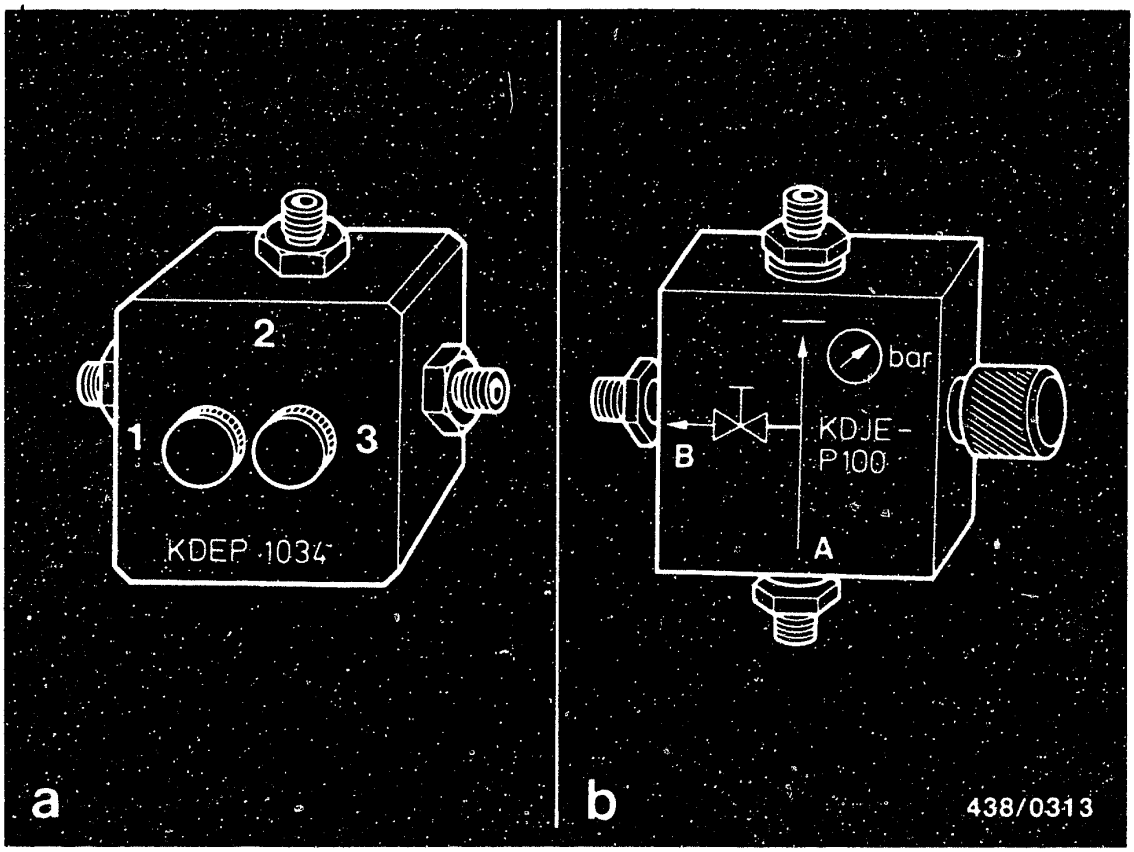
The primary pressure is readjusted by replacing the shims (Item 5).

Note:

0.1 mm more of shim thickness means about 0.15 bar pressure increase and vice versa.

To do this, screw out the large screw plug (Item 8) together with the push valve. After carrying out the adjustment, always fit the screw plug with a new flat seal ring (Item 7) and O-ring (Item 6).

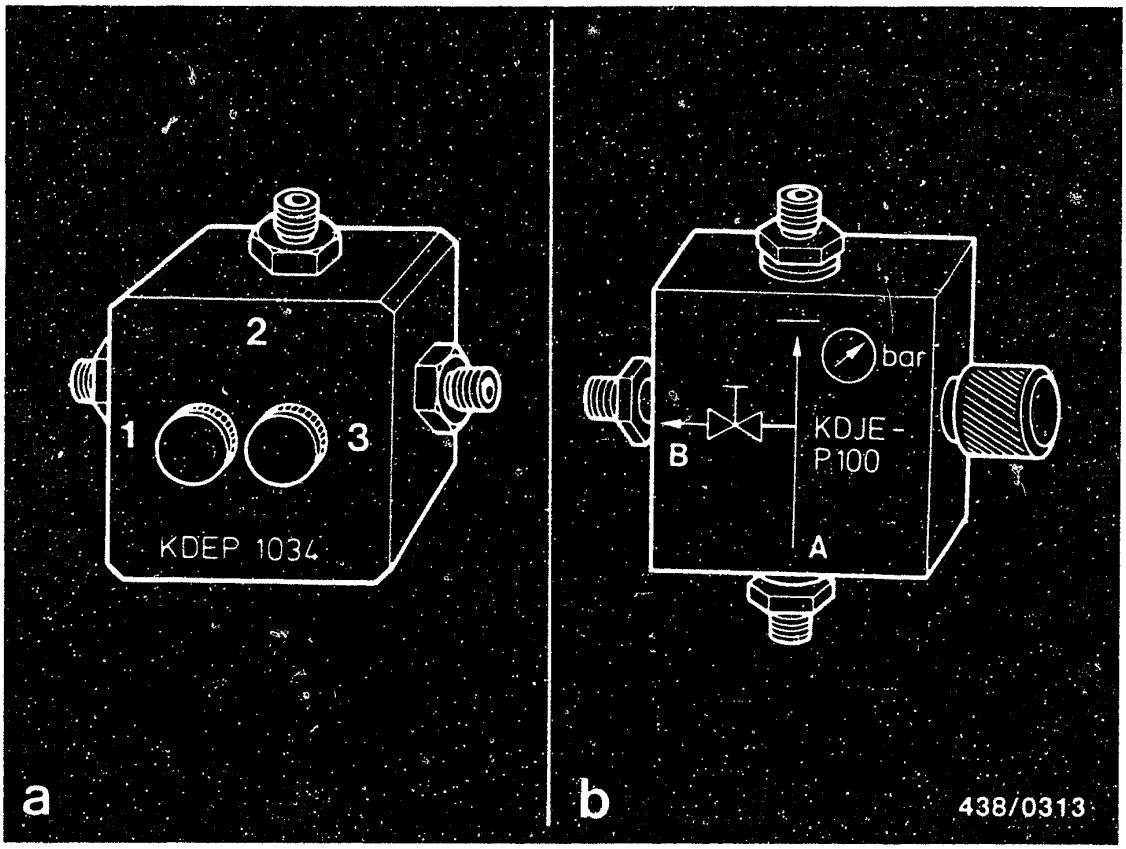
The control piston (Item 3) of the primary-pressure regulator must not be lost. It was matched specially to the fuel distributor housing in the manufacturing plant and therefore is the only part of the primary-pressure regulator which must not be replaced.



16. Testing the entire fuel system for leaks.

16.1 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

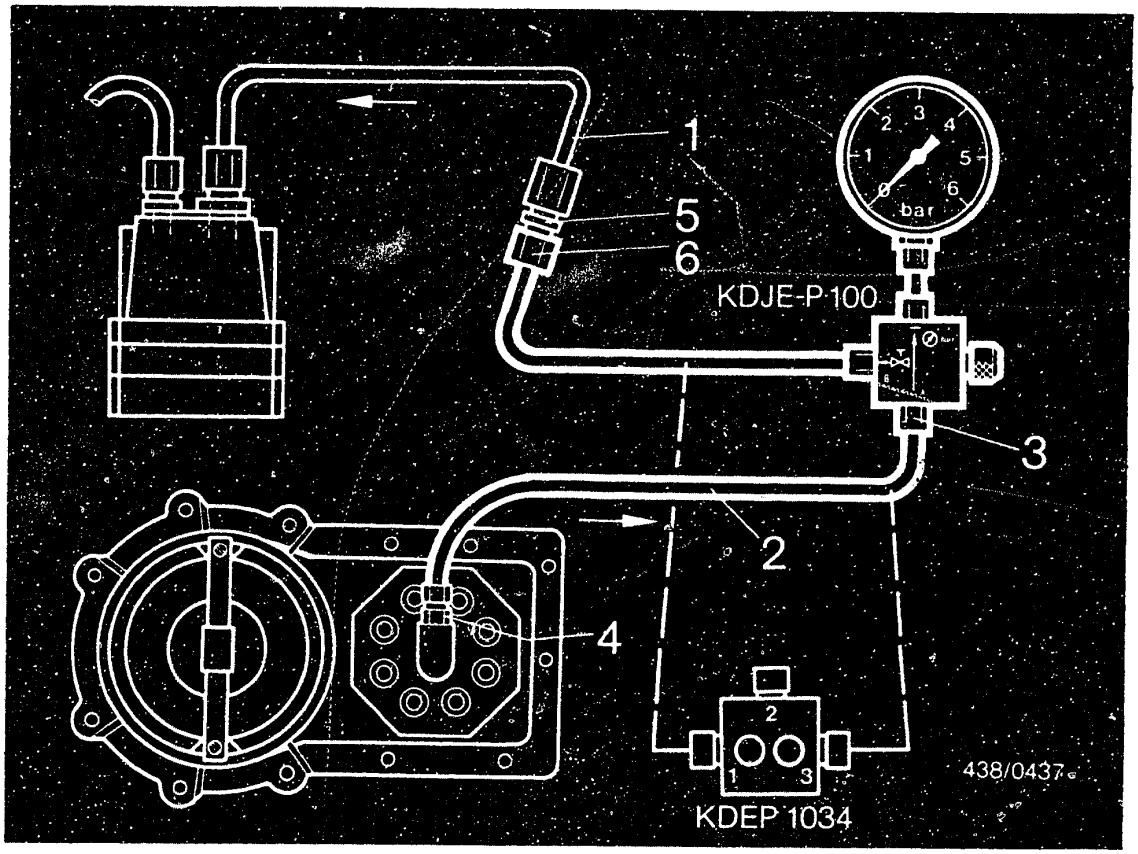
The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a).



Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:

A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

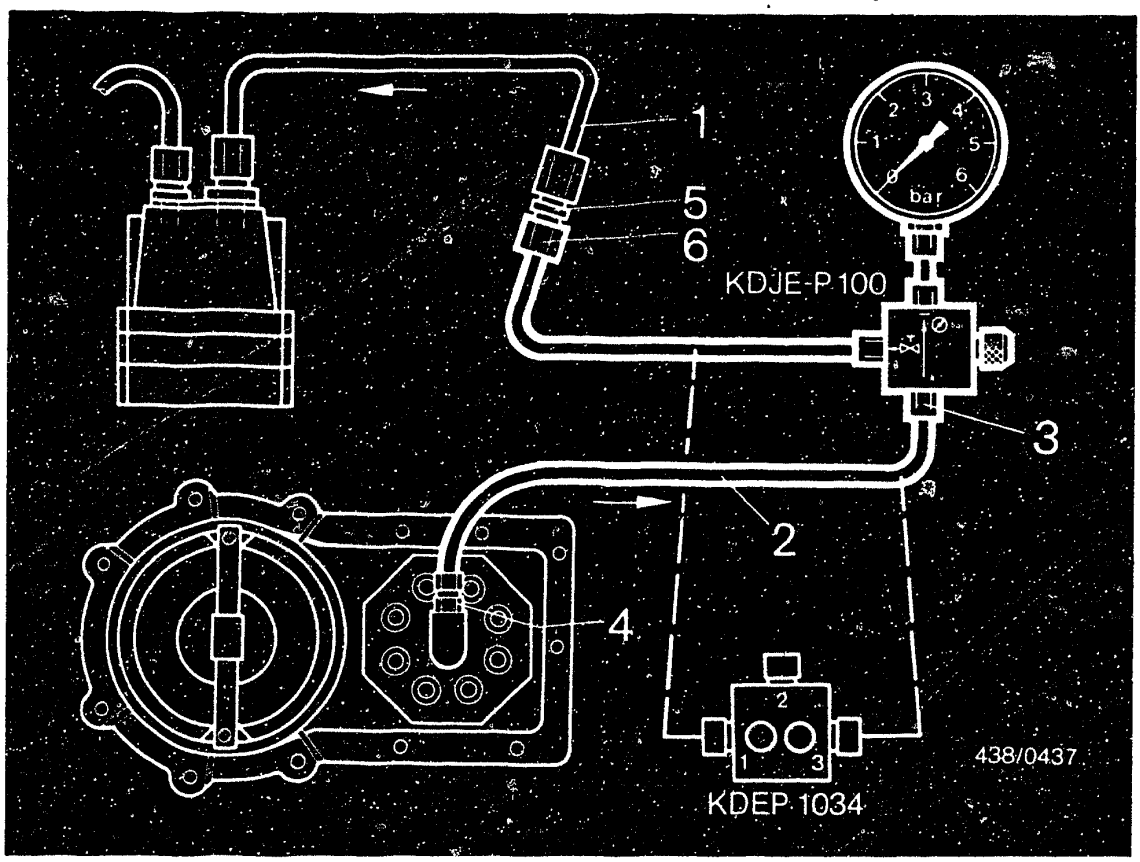
Caution:
When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

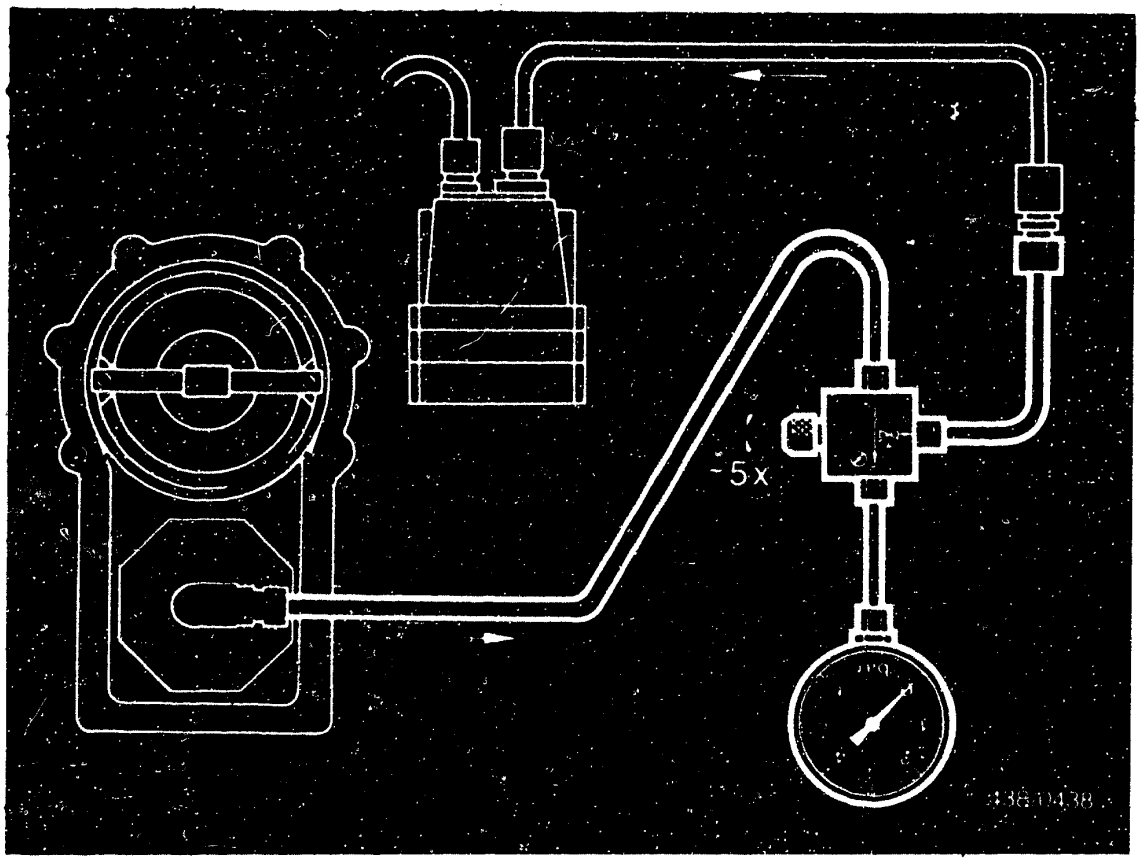
Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.



Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).

Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).

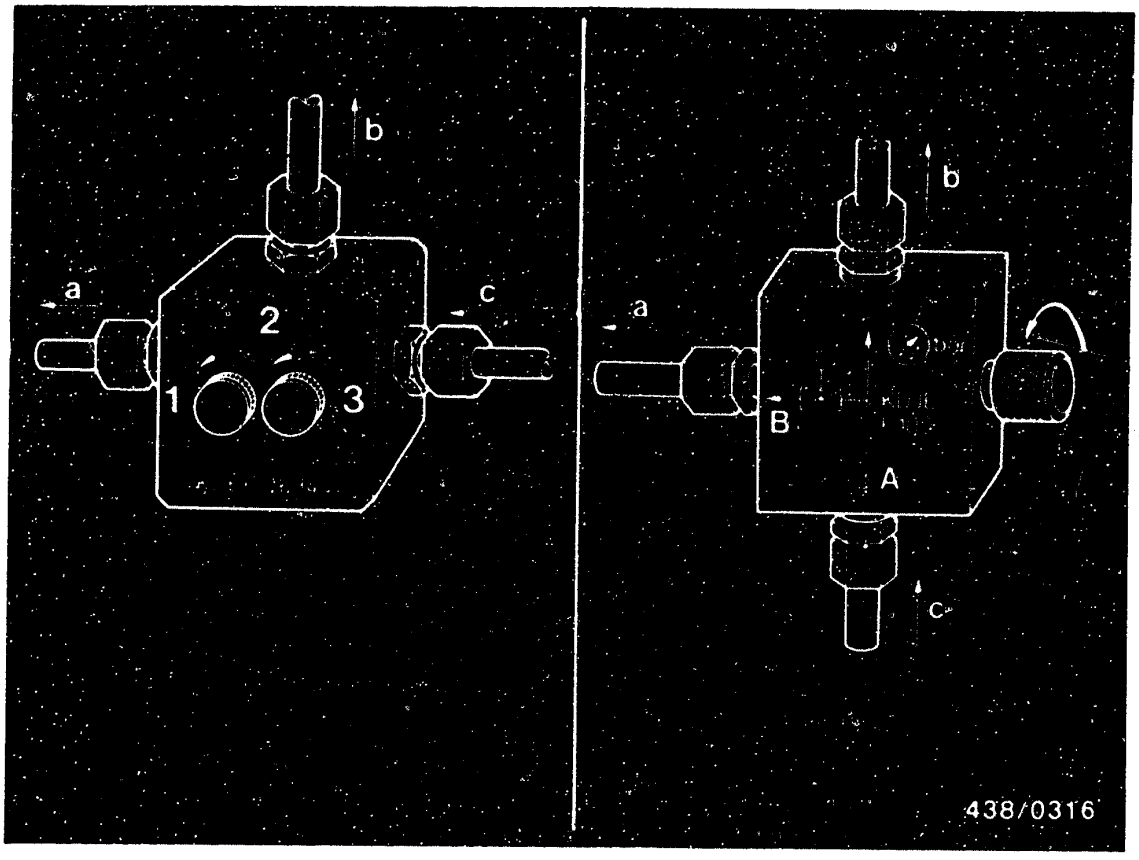


16.2 Bleeding the pressure tester

Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hang down (hose fully extended). Switch on the electric fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood). Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).

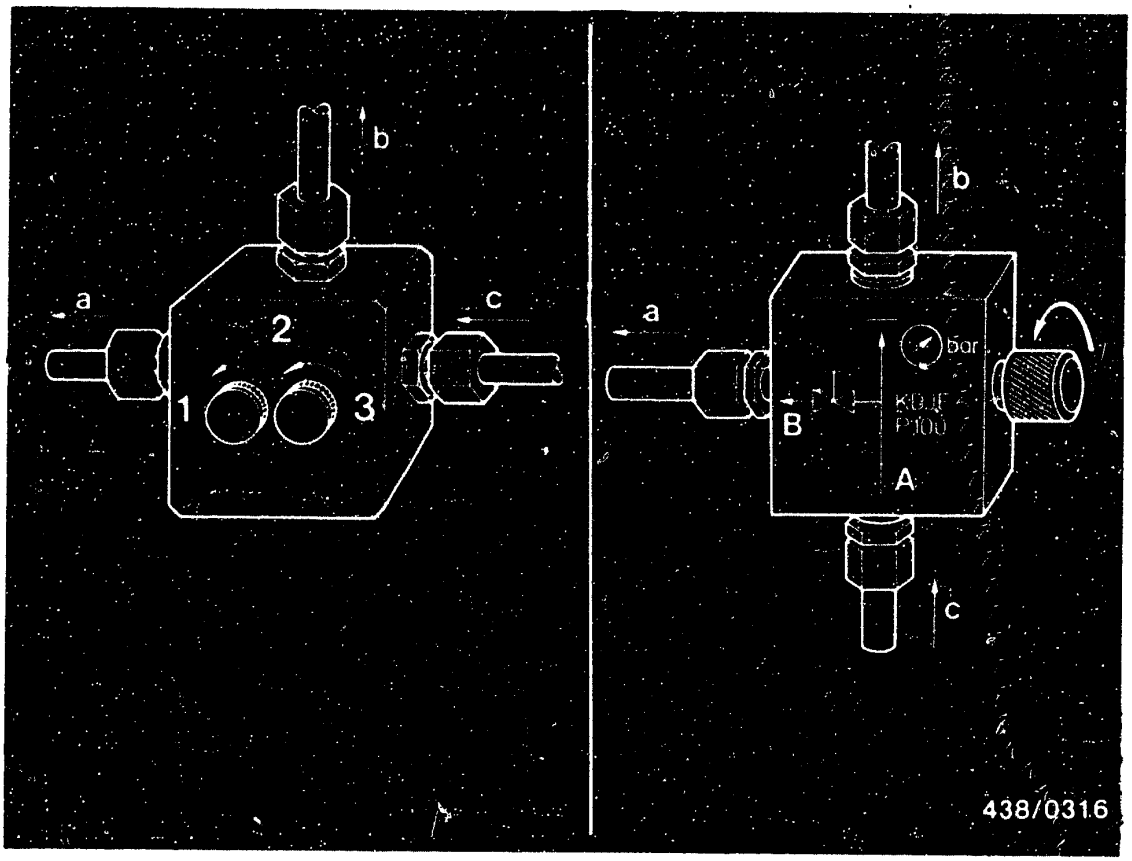


a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

16.3 Leak test

The test is performed with the engine switched off. Make the test with a warm engine but not immediately after the engine has been operated at a high temperature.

Open the valve screw of the directional-control valve (both valves in the case of KDEP 1034).

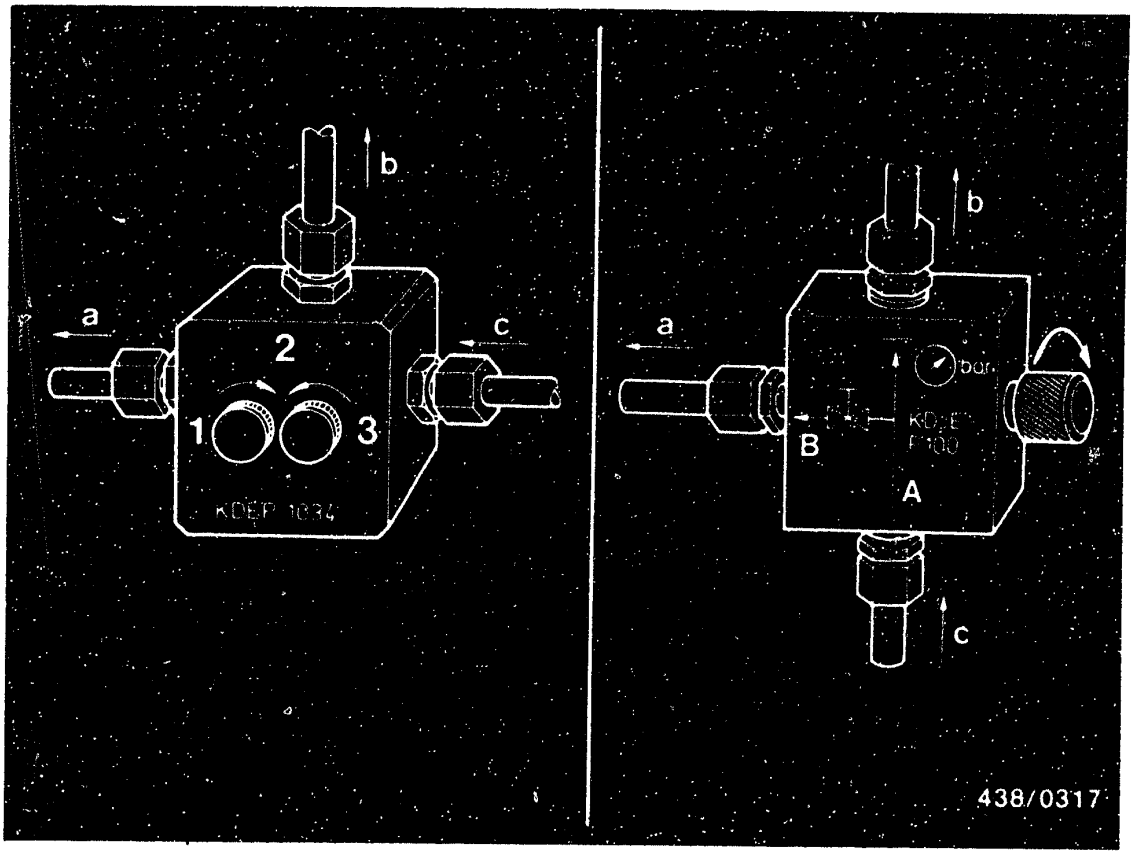


Switch on the electric fuel pump by bridging the electrical safety circuit until the warm-up regulator has ceased to operate ("warm" control pressure).

Switch the electric fuel pump off again and observe the drop in pressure on the pressure gauge.

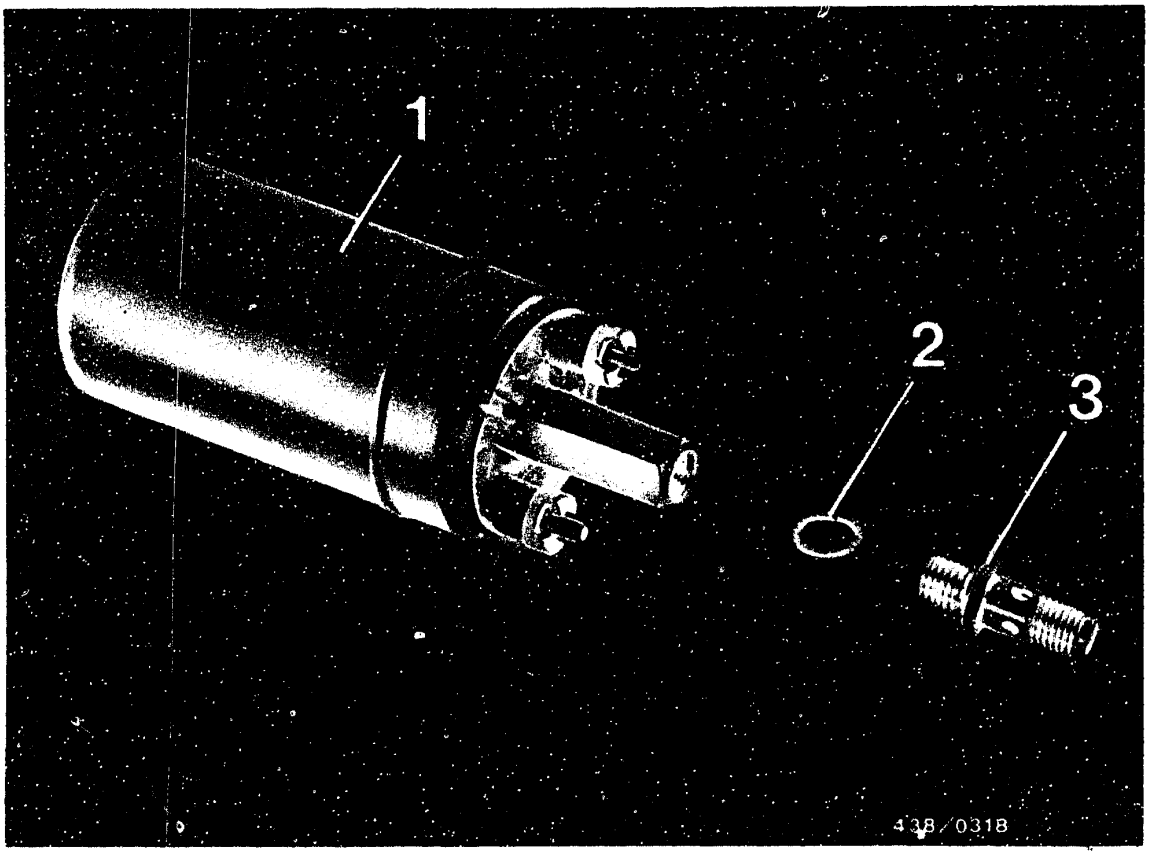
Test specifications for leak test:

Minimum pressure after:
10 minutes: 1.7 bar (1.8 kgf/cm²) gauge pressure
20 minutes: 1.5 bar (1.6 kgf/cm²) gauge pressure



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

If the pressure drops too quickly, repeat the test with the control-pressure circuit disconnected.
Position of the valve screws:
Close the valve screw of the directional-control valve KDJE-P100.
In the case of KDEP 1034, close valve screw 1, open valve screw 2.
If the same result is found, the leak is in the primary-pressure circuit.
If the test results are correct during the second test, the leak is in the control-pressure circuit.



1 = Electric fuel pump
2 = Flat seal ring
3 = Tube fitting

16.4 Possible causes of a defect in the primary-pressure circuit:

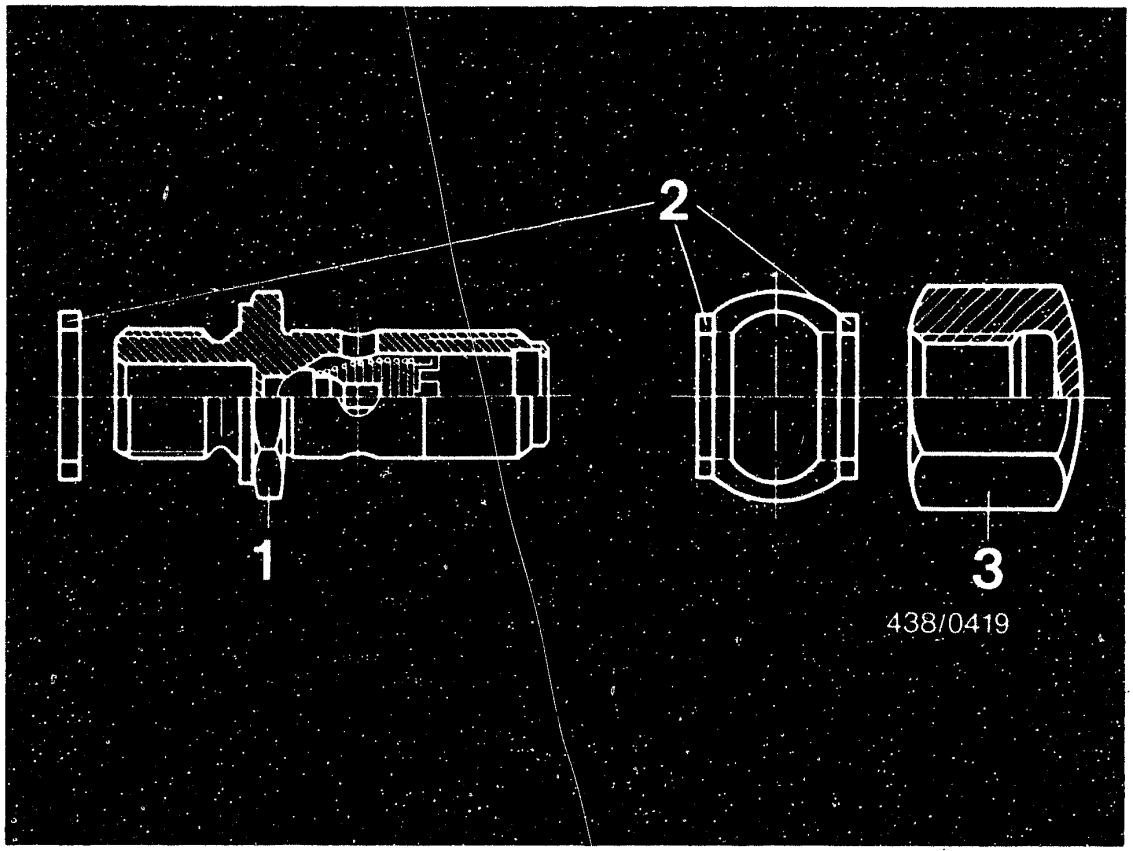
- Non-return valve in the pressure connection piece of the electric fuel pump has a leak.

Part No. of electric fuel pump: 0 580 254 975
0 580 254 984

The non-return valve is built permanently into the pressure connection piece and cannot be replaced.

In order to avoid changing the complete electric fuel pump when a non-return valve has a leak, a parts set with a separate non-return valve has been produced which can be used in the above-mentioned electric fuel pump.

Part No. of the parts set: 1 587 010 003.

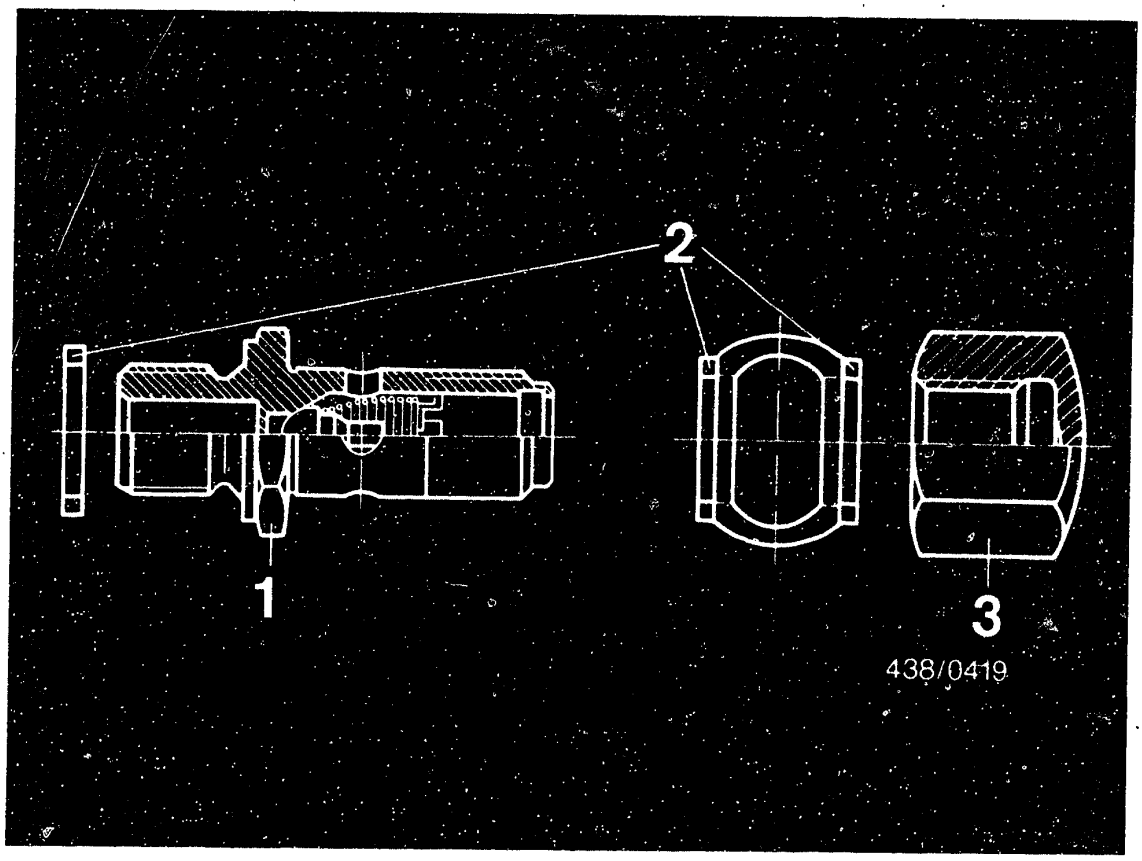


1 = Tube fitting
2 = Flat seal rings
3 = Cap nut

Fitting the parts set:

Remove the dirt trap and thoroughly clean the connection of the fuel tubing to the electric fuel pump. Pinch off the intake hose (fuel tank - intake-noise damper) (e.g. using hose clamper W 157 from Matra Co.).

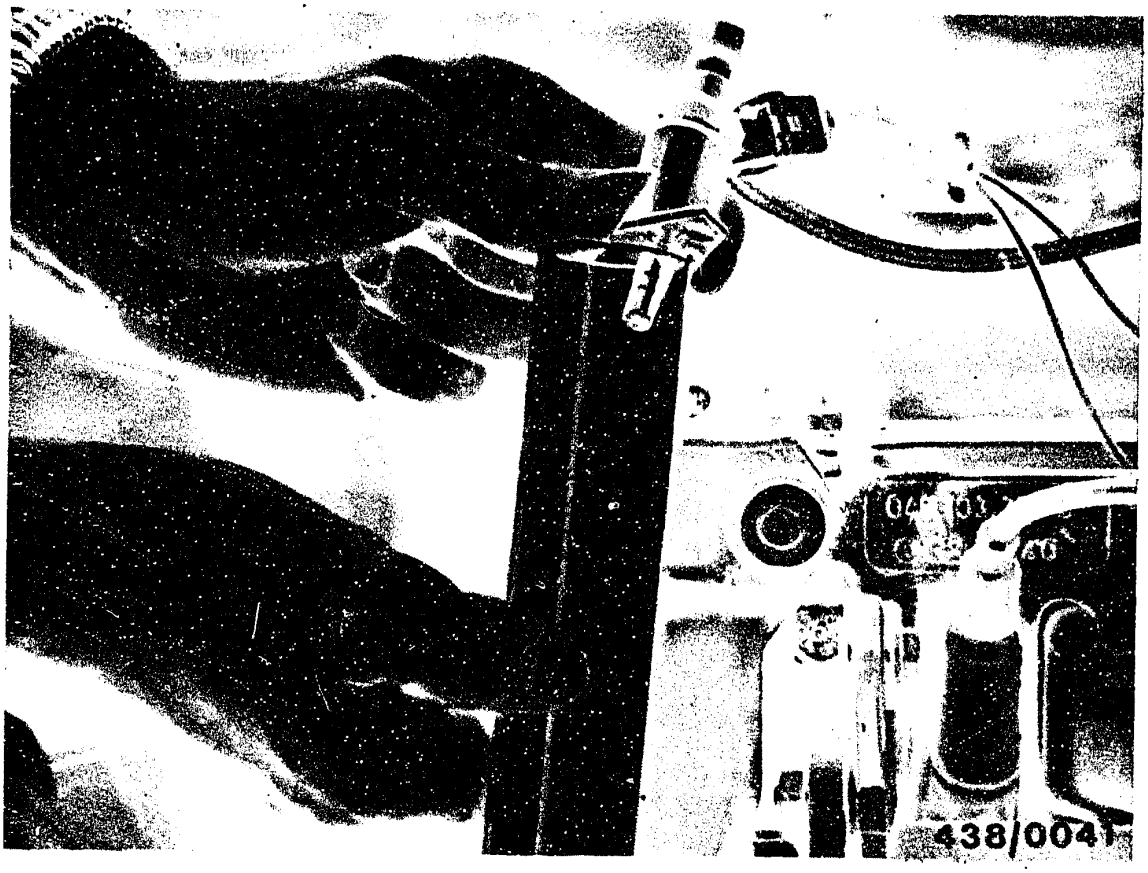
Screw off fuel tubing, catching the fuel which flows out.



The defective original non-return valve remains in the electric fuel pump.

Screw tube fitting from parts set (short end) with thick flat seal ring into the pressure connection piece and tighten to a torque of 17...25 Nm. At the same time apply a wrench to the hexagonal section of the pressure connection piece.
Fit a thin flat seal ring, fuel-line inlet union and another flat seal ring onto the long end of the tube fitting and tighten with the hexagon cap nut.
Remove hose clamper from intake hose.

Check connections for leaks with the electric fuel pump in operation.

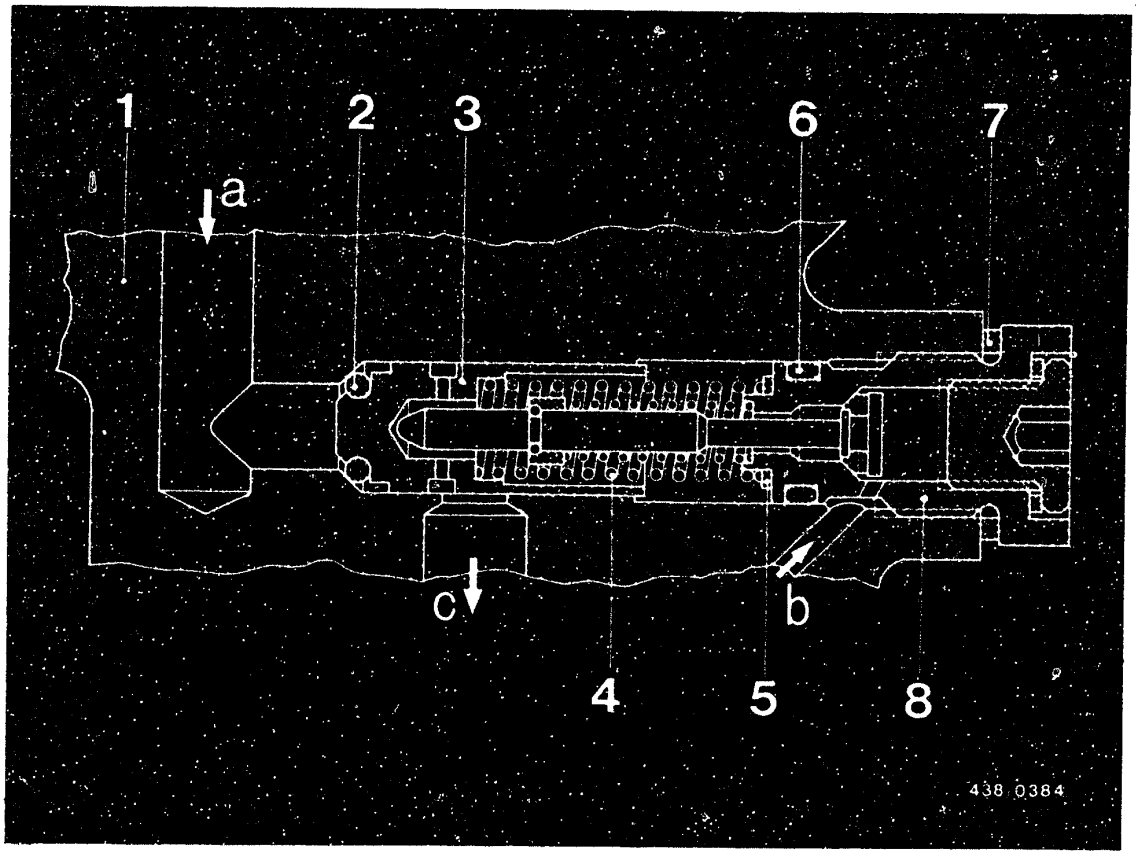


- The cold-start valve has a leak.

  Remove cold-start valve and connect hose line in place of the steel tubing.
  Hold start valve in a suitable container (e.g. graduate).
  Switch on the electric fuel pump by bridging the electrical safety circuit.

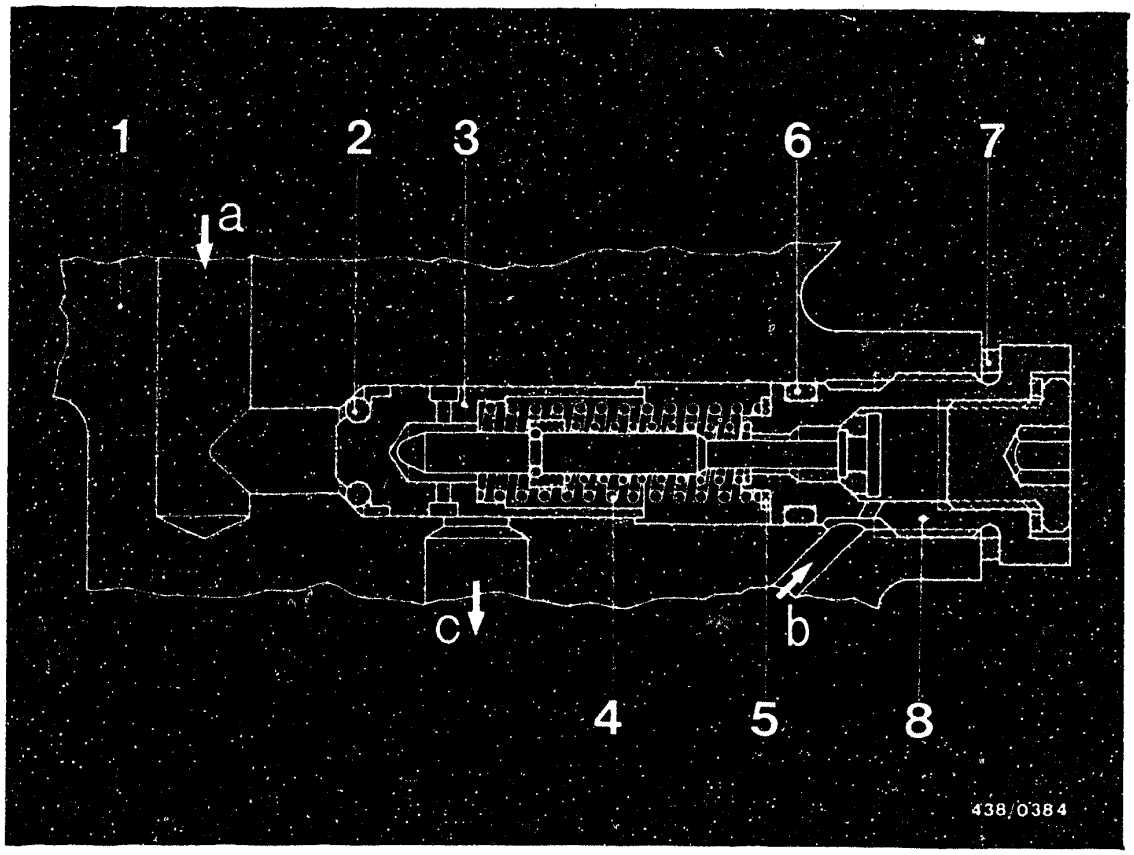
  Dry off the nozzle of the cold-start valve.
  No drops must fall from the nozzle of the start valve within the next minute. Even when shaken and knocked, the start valve must not leak.

  Switch the electric fuel pump off again.
  Replace the cold-start valve, if leaky.



a = Primary pressure
b = From warm-up regulator
c = Fuel return
1 = Fuel-distributor housing
2 = O-ring
3 = Control piston
4 = Control spring
5 = Shim(s)
6 = O-ring
7 = Flat seal ring
8 = Screw plug

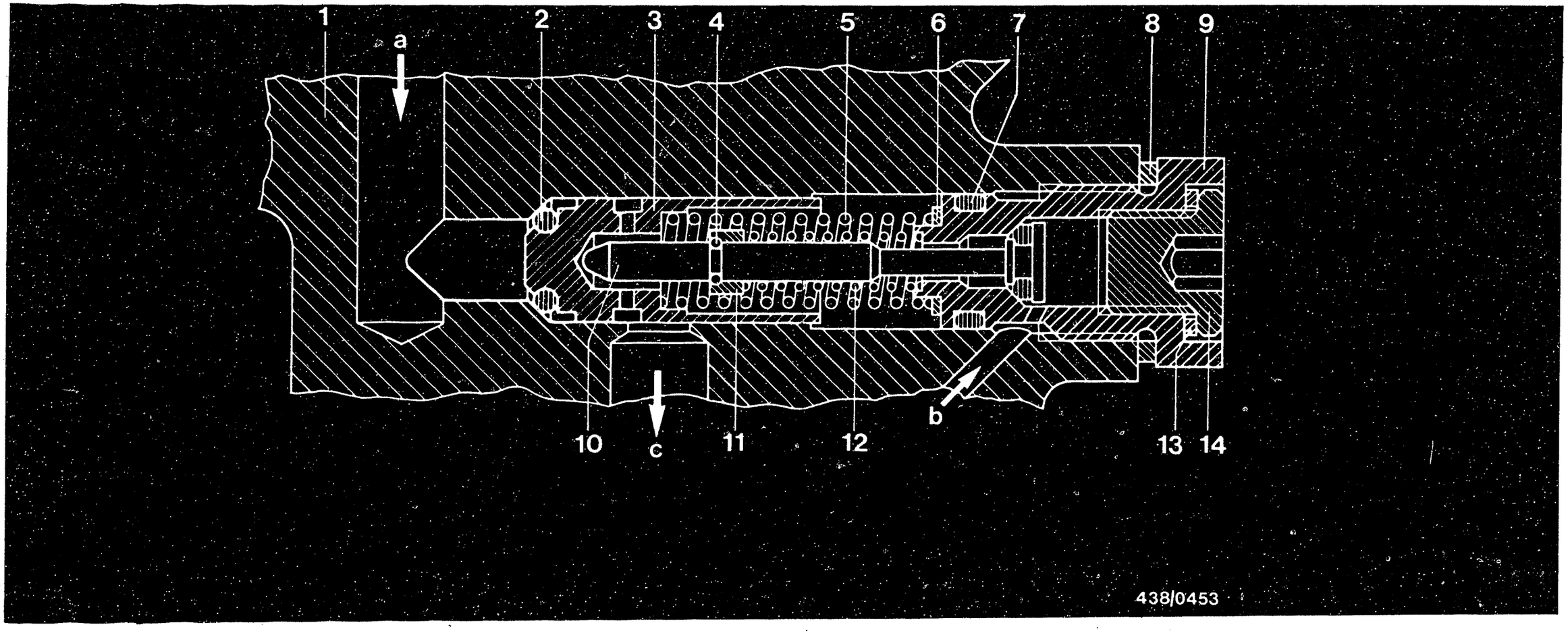
- Seal ring on control piston of primary pressure regulator has a leak.
  Replace seal ring:
  Clean the fuel distributor in the region of the primary-pressure regulator. Screw out the large screw plug (8) with the complete push valve. Also remove shims (5), control spring (4) and control piston (3).



Replace O-ring 2, fit control piston and control spring.

Screw in screw plug with complete push valve and with shims (as they were before removal) and new seal rings (6 and 7).
Finally check primary pressure and, if necessary, adjust by changing the shims (5).

Fuel distributor Part No.	Setting values - primary pressure
0 438 100 012 0 438 100 034	5.3...5.5 bar (5.4...5.6 kgf/cm²) Gauge pressure



a = Primary pressure
b = From warm-up regulator
c = Fuel return

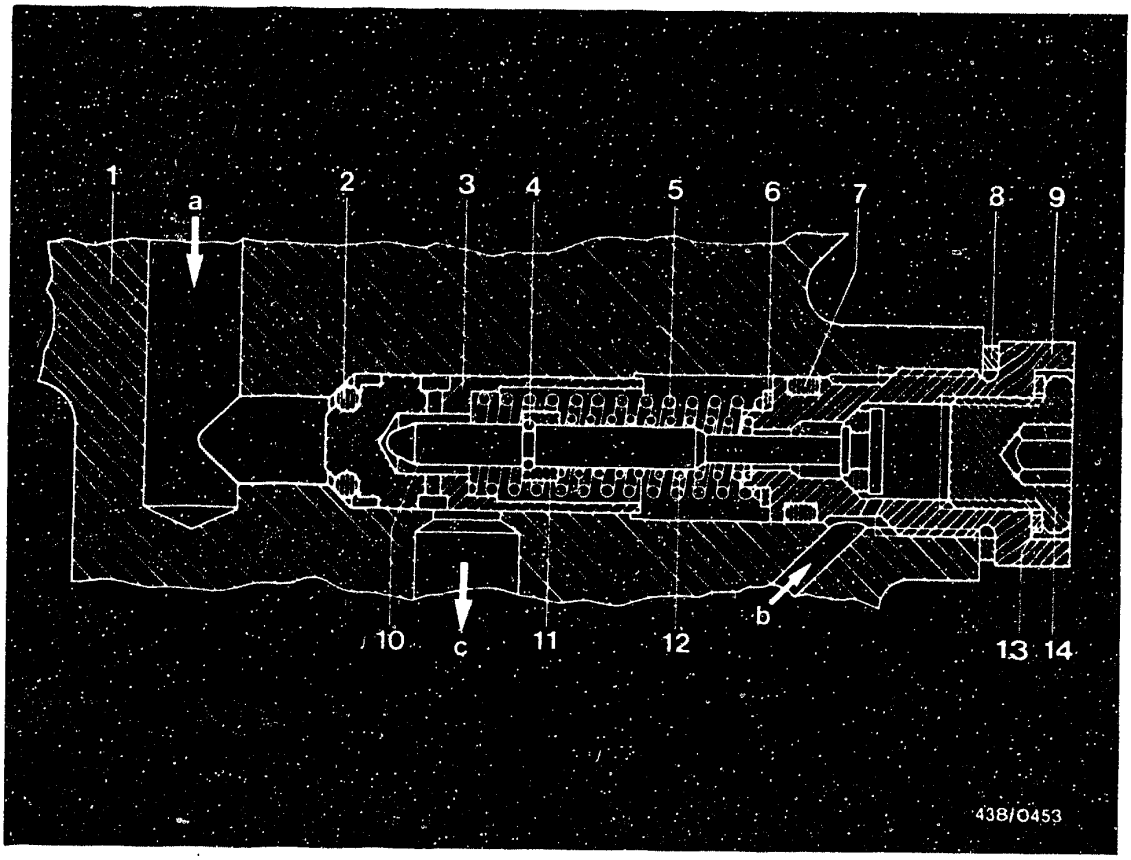
1 = Fuel-distributor housing
2 = Shaped seal ring
3 = Control piston
4 = Retainer
5 = Spring

6 = Shims
7 = O-ring
8 = Seal ring
9 = Screw plug
10 = Valve needle

11 = Retaining ring
12 = Spring
13 = Flat flange gasket
14 = Screw plug

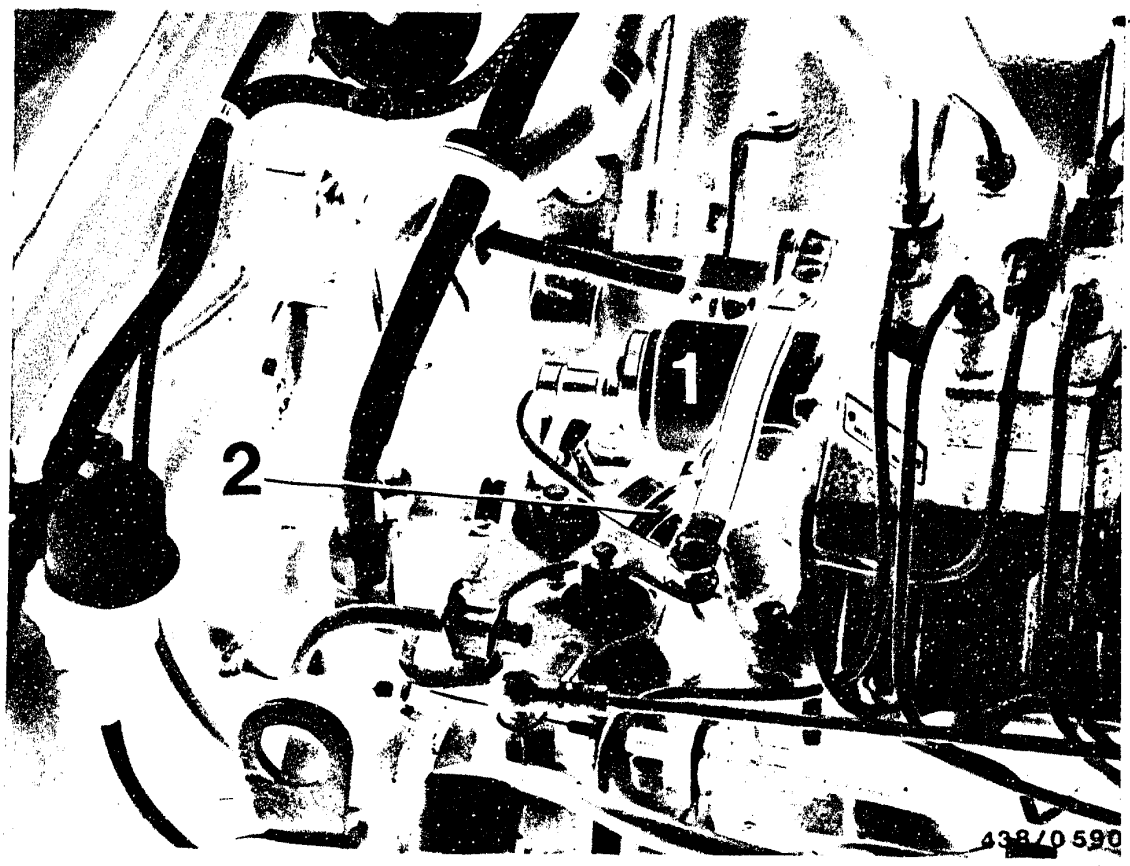
16.5 Possible causes of a defect in the control-pressure circuit

• The push valve has a leak.
Replacing the push valve.
Since the seal ring of the push valve is rigidly vulcanized onto the valve needle, the screw plug (9) must be changed with the complete push valve (ready-assembled unit).
This also applies to earlier versions of the push valve with a loose O-ring on the valve needle.
The O-ring is no longer obtainable. When necessary, therefore always fit the complete valve unit.



Clean the fuel distributor in the area of the primary-pressure regulator. Screw out large screw plug (9) with complete push valve. Be careful with the control spring (5) and the shims (6).
Screw in new push valve with the same number of shims (6) as before, new O-ring (7) and flat seal ring (8). Finally check the primary pressure once again and, if necessary, adjust by changing the shims (6).

Fuel distributor Part No.	Setting values - primary pressure
0 438 100 012	5.3...5.5 bar (5.4...5.6 kgf/cm²)
0 438 100 034	Gauge pressure



- Fuel-line-pressure damper has a leak

It is possible to determine whether the fuel-line-pressure damper (2) has a leak by removing the hose from the leakage-fuel connection.

Fuel-line-pressure damper 0 280 161 005 ... 007

When the customer complains that "the engine stops and won't start again", the fault may be in the fuel-line-pressure damper in the control-pressure line which leads from the warm-up regulator to the fuel distributor.

If there are leaks in the diaphragms in the fuel-line-pressure damper, fuel can flow via the leakage pipe into the air guide housing or via the shaped hose to the idle air duct into the intake manifold and perhaps into the vacuum pipe of the automatic transmission. During starting, damage could occur to the engine due to the increased combustion forces released when this fuel is drawn in;

Replace leaky fuel-line-pressure dampers. At the same time, suck fuel out of lower part of intake manifold and out of cylinders with a suitable syringe.

Check and renew fuel-line-pressure damper.

Remove air filter. Unscrew leakage pipe from air guide housing or shaped hose, or from fuel-line-pressure damper. Catch any fuel which may escape.

Switch on ignition and pull out cable plug from safety switch so that the fuel pump operates.

If fuel now comes out of the leakage line or the fuel-line-pressure damper, then the diaphragm in the damper is defective.
Fit the new damper so that the groove in the damper housing locks into the lug of the holder.

Suck off the fuel from the lower part of the intake manifold and from the cylinders with a suitable syringe as follows:

- Unscrew vacuum connection (brake assembly) from intake manifold. Insert a plastic tube (similar to that used for ignition timing control) into the intake-manifold connection up to the lower part of the intake manifold and suck off fuel. Screw vacuum connection back on.
- Unscrew all spark plugs and suck out fuel from each cylinder.

In vehicles with automatic transmission, unscrew the cap of the plastic vacuum unit from the transmission, so that any fuel present can flow out.
Put the cap back on.

Let the engine run and test the fuel-line-pressure damper for leaks by removing the leakage pipe.

17. Testing the injection valves

Remove the injection valves for testing.
When loosening the fuel lines, apply counter-force at the fixed hexagon of the injection valves.
Caution! Do not bend steel fuel lines!
When refitting the injection valves, it is best to replace the O-rings on the valve stem (Mercedes-Benz service part) in order to prevent leaks and thus the entry of unmetered air.

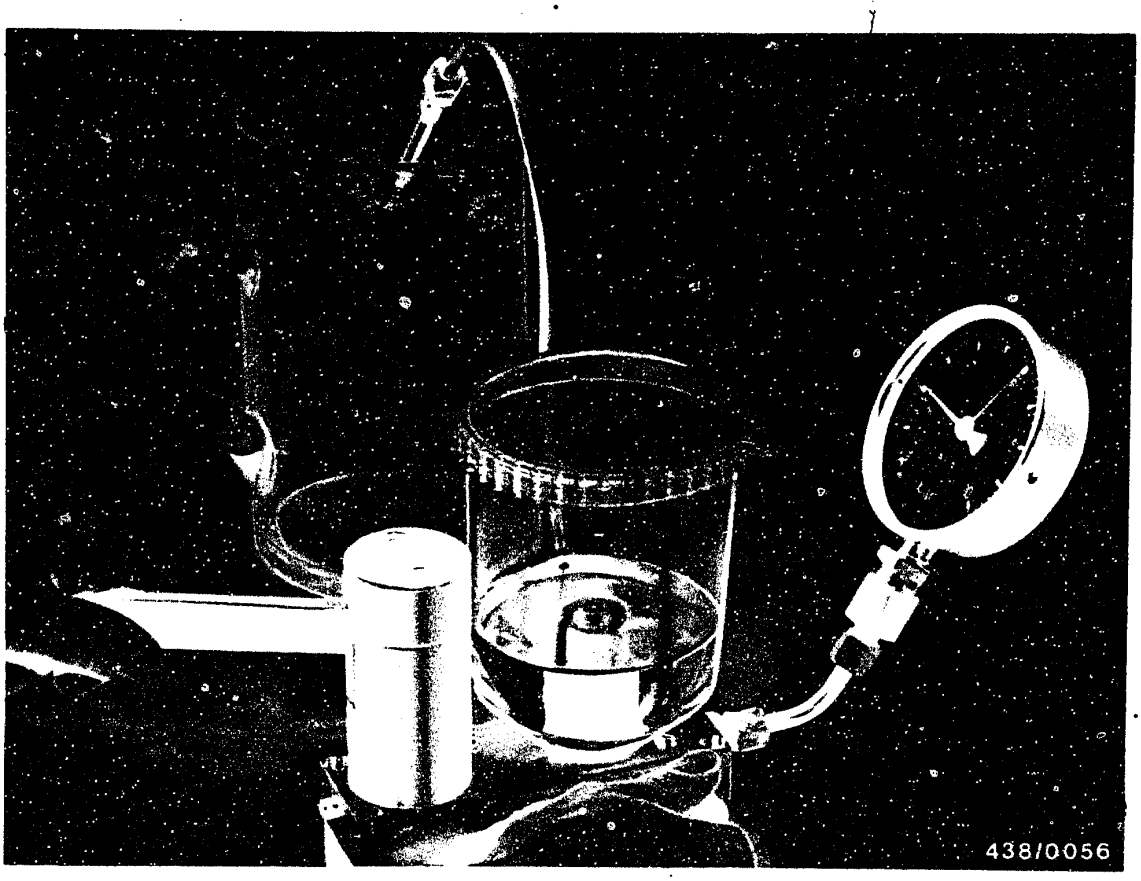
17.1 Test equipment and test media

The following testing specification refers to valve testers KDJE-P400 (previously KDEP 7452) and 0 681 200 700.

Observe the test-media specification!

Test media: Calibrating fluid (Shell K30, Esso-Varsol, Shell Mineral Spirits 135).
or
Bosch Part No. VS 14 942-CH
Former Part No. 5 973 340 650
The calibrating fluid can be obtained in 5 l metal cans from the following supplier:
Firma
Oskar Gnamm GmbH & Co
D-7531 Kämpfelbach-Bilfingen

Caution:
For safety reasons, never use normal gasoline or similar easily inflammable and combustible liquids. Even with calibrating fluid, be sure to observe the local official regulations.



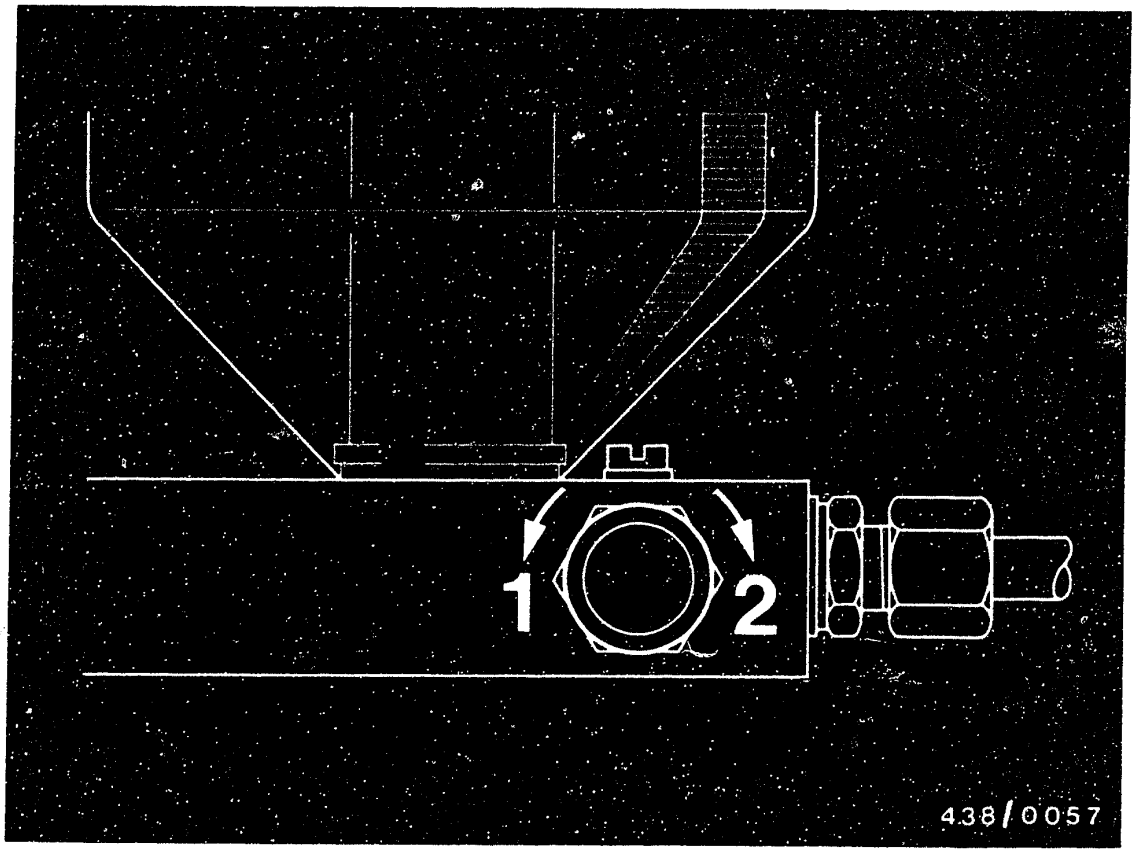
17.2 Connecting the injection valve to the tester

Connect injection valve to valve tester and bleed the discharge tubing by moving the lever back and forth several times with the union nut open. Then tighten the union nut.

17.3 Checking for dirt

Move the hand lever slowly (about 2 seconds per stroke) back and forth with the stopcock on the pressure gauge open. If the pressure does not build up to 1...1.5 bar gauge pressure, the injection valve has a bad leak (caused, for example, by dirt stuck in it).

You can try to flush the injection valve clear by moving the lever back and forth several times strongly. If this attempt is successful, continue the test. If it is not possible to flush the valve clear, replace it.

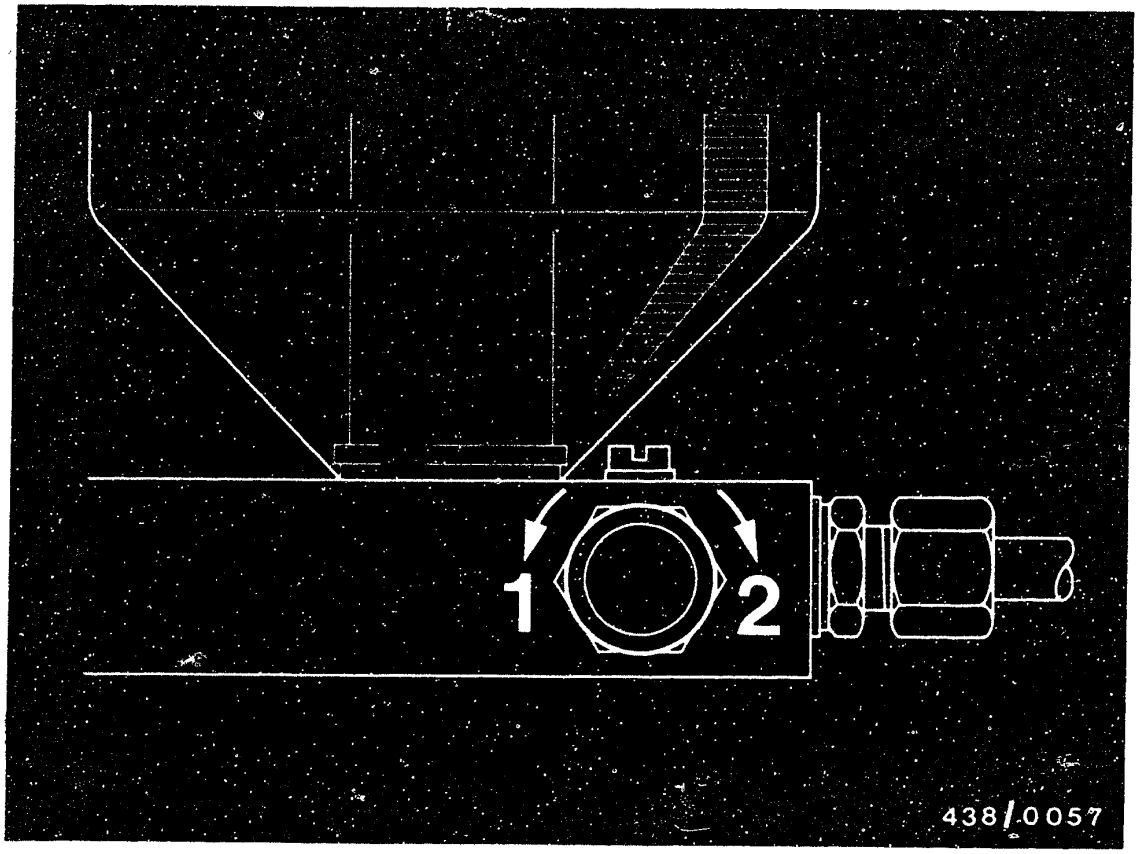


1 = Open 2 = Close

17.4 Testing the opening pressure

Injection valve Part No.	Test specifications - opening pressure
0 437 502 010	3.0...4.1 bar (3.1...4.2 kgf/cm²) gauge pressure

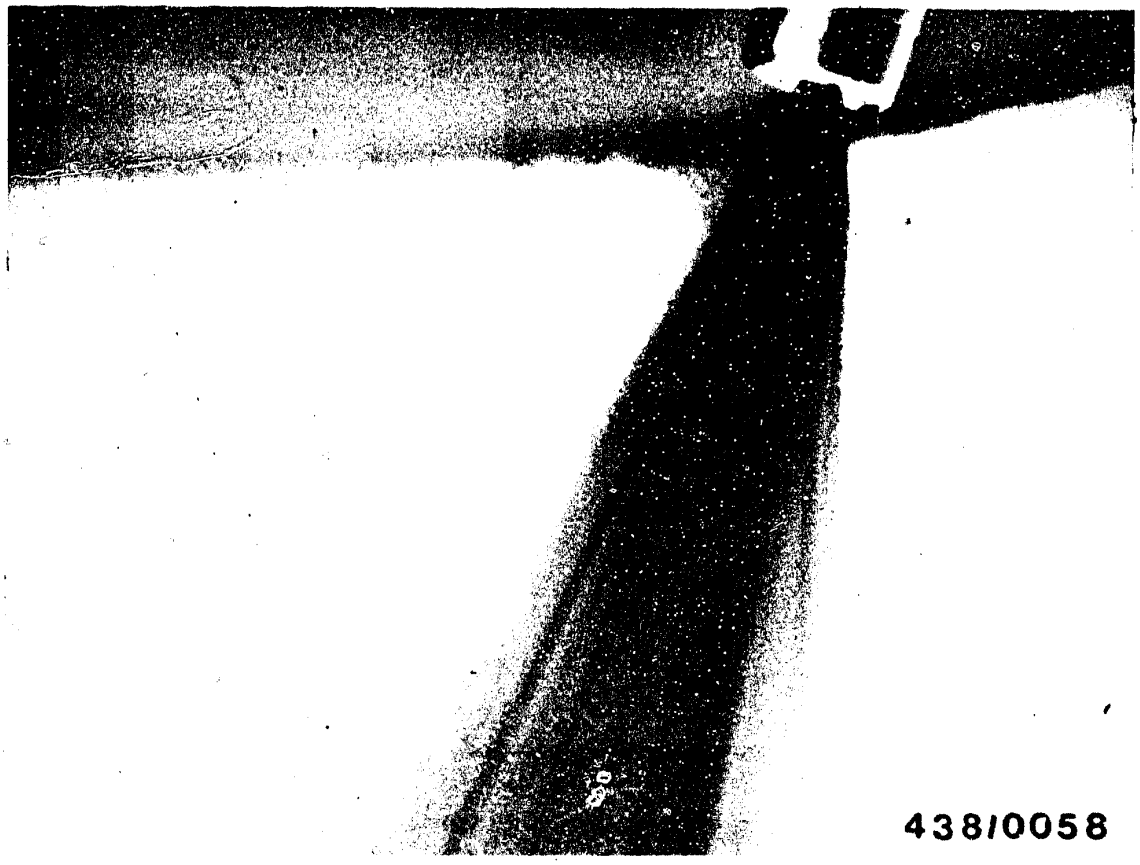
With the stopcock closed, flush the valve out and bleed it with several rapid movements of the lever.
Open the stopcock and test the opening pressure by moving the lever slowly (about 2 seconds per stroke).
If the opening pressure is outside tolerance, replace the injection valve. Individual valves can also be interchanged within a set.



1 = Open 2 = Close

17.5 Leakage test

Open the stopcock, build the pressure up slowly to a value 0.5 bar under the opening pressure determined previously (but not less than 2.8 bar gauge pressure), and hold it constant at that level. No drops must now fall from the valve for the next 15 seconds.



438/0058

17.6 Chatter test, evaluation of spray

Move the lever back and forth at about 1 stroke per second. As this is done, the valve must chatter. No drops of fuel must form at the mouth of the valve. The valve must not produce a "cord spray". Formation of a single-sided, atomized spray within an overall spray angle of about 35° is permissible (see example given in illustrations).

Illustration shows good spray formation.

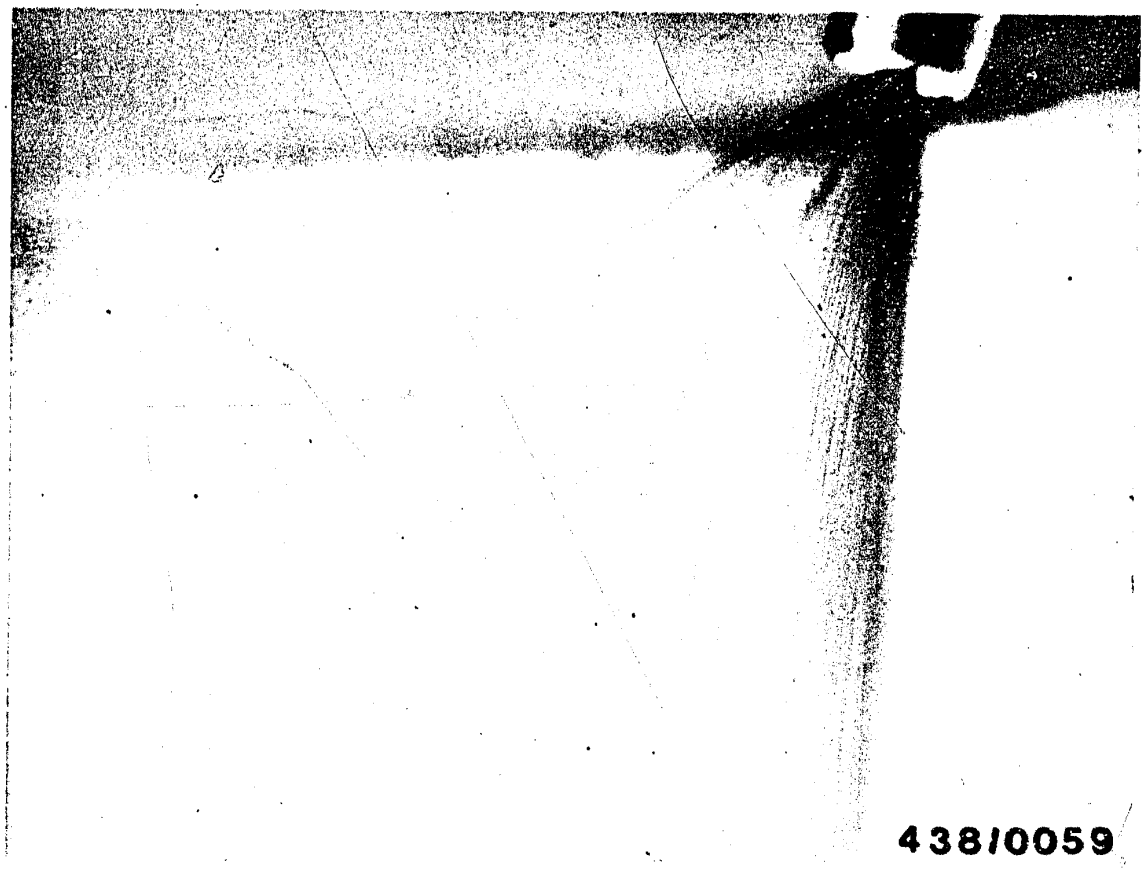
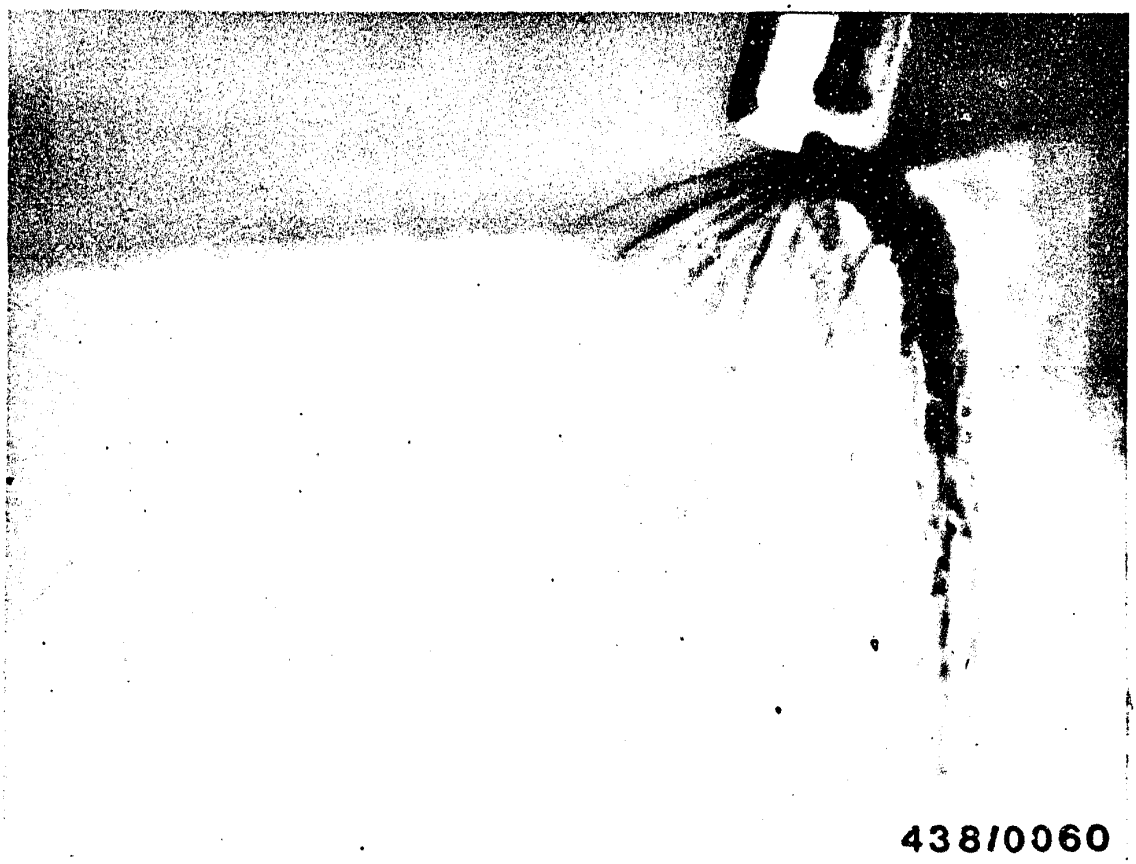


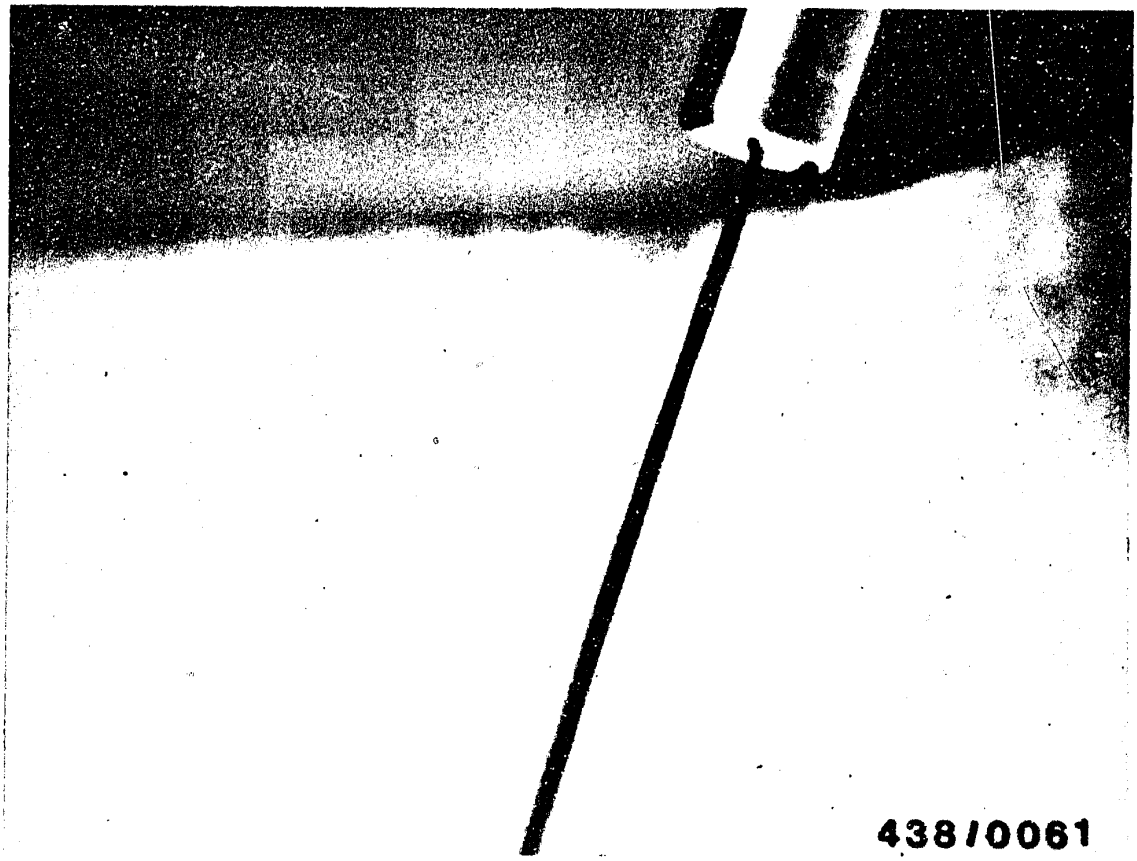
Illustration shows single-sided but nevertheless good spray formation.



438/0060

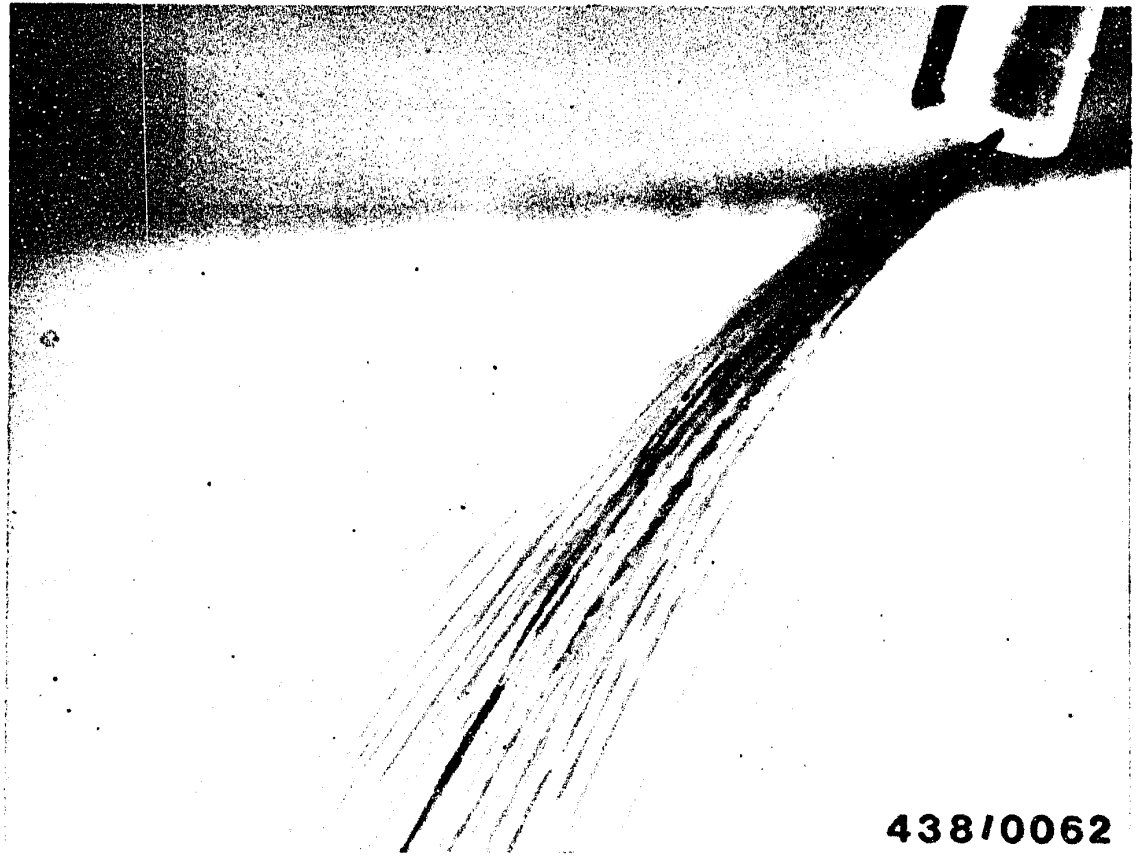
Poor spray formation; replace injection valves.

Illustration shows drop formation.



Poor spray formation; replace injection valves.

Illustration shows "cord" spray.



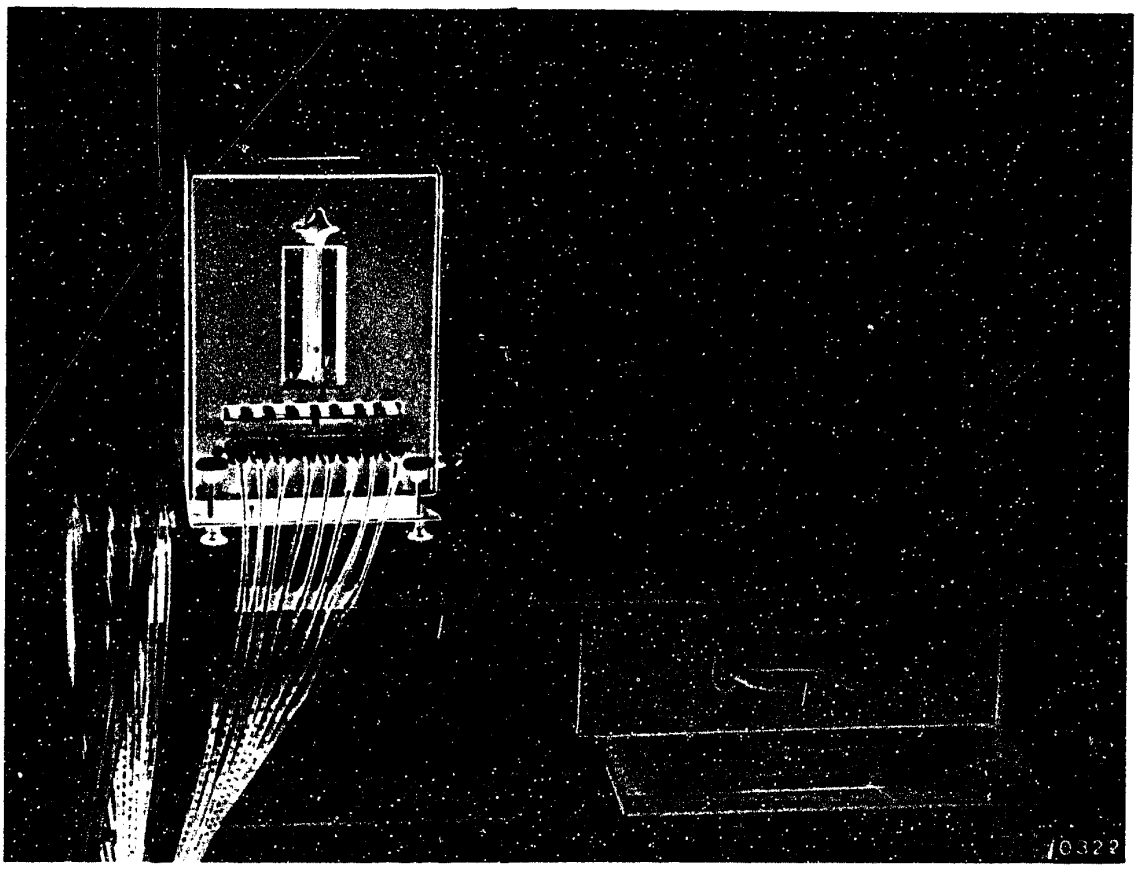
438/0062

Poor spray formation; replace injection valves.

Illustration shows "spray in strands".

If defective injection valves have been replaced, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F18.

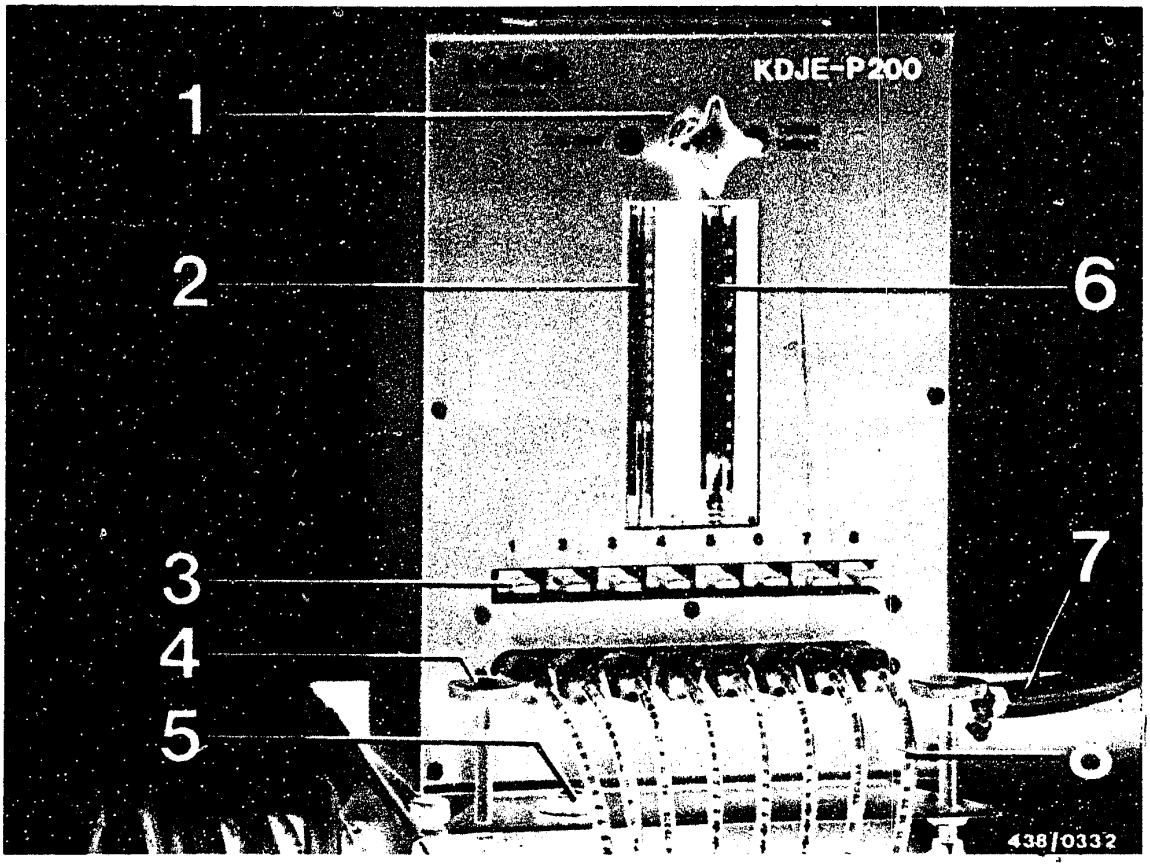


18. Comparative measurement of fuel delivery of fuel distributor outlets.

This test is carried out using the tester for delivered quantity comparison KDJE-P200 (previous KDJE 7451).

18.1 Application

By means of comparative measurements, the differences in the amounts of fuel delivered from the individual outlets on the fuel distributor are determined.
The tester is designed so that the test can be made on the vehicle without having to remove the fuel distributor.
Since the test is made with the original injection valves, the operator can recognize at the same time whether delivered-quantity scatter, if it occurs, is caused by the fuel distributor or by the injection valves.



1 = 3-way cock
2 = Small rotameter tube
3 = Keyboard
4 = Adjusting screw for setting up
5 = Spirit level
6 = Large rotameter tube
7 = Hose lines
8 = Return hose

18.2 Construction

The tester is designed for use with all engines, up to 8 cylinders, equipped with K-Jetronic.

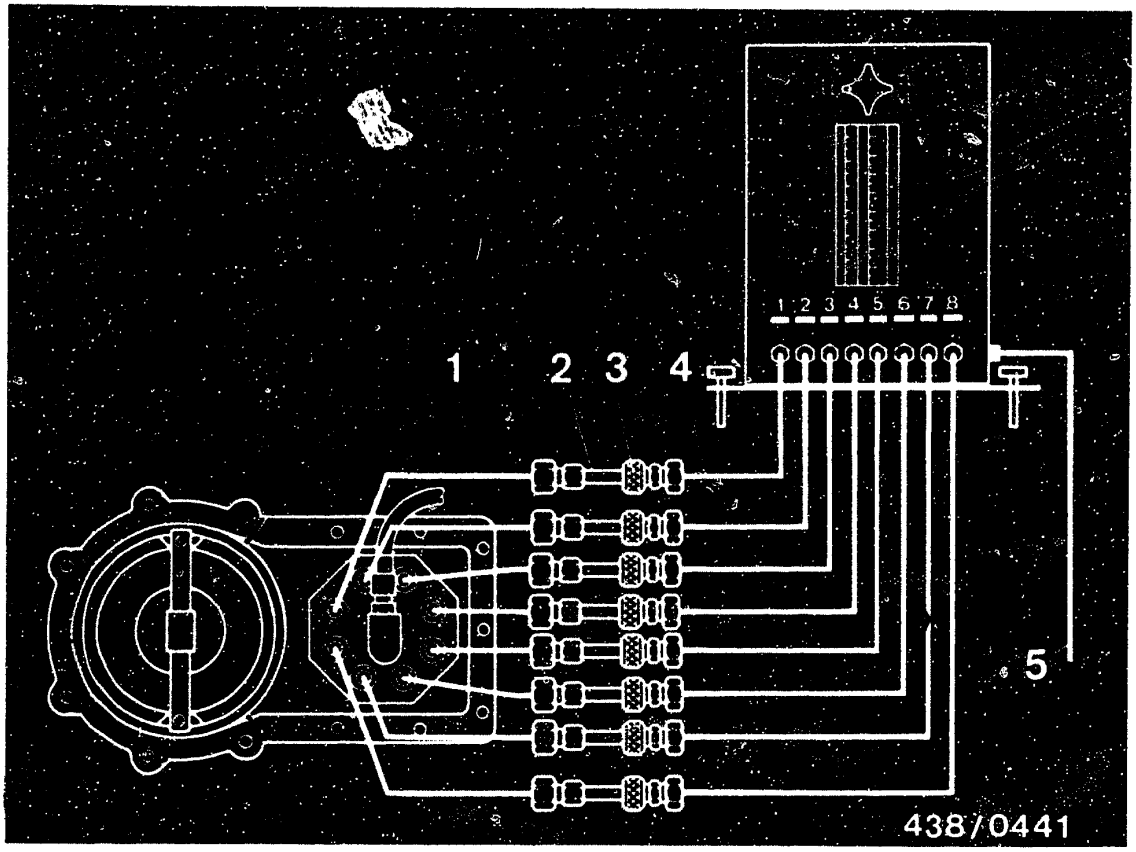
Basically, the tester consists of a steel housing containing 2 rotameter tubes with measuring ranges of 2...15 cm^3 and 10...180 cm^3, an 8-way valve for key operation (Item 3) and a 3-way stopcock (Item 1).

The small rotameter tube (Item 2) is used for the idle measurement while the large tube (Item 6) is used to measure the fuel delivery at part- and full-load. The particular rotameter tube to be used is connected by means of the 3-way stopcock. Using the 8-way valve, the fuel delivery of each cylinder is tested one after the other.

Attached to the tester are 8 hoses (Item 8), each terminated with an automatic connector. When the injection valves are withdrawn from their sockets on the engine they are attached to these connectors. Each automatic connector is fitted with a push valve so that no fuel can escape from connectors that are not in use (when 4- or 6-cylinder systems are tested).

The fuel is returned to the fuel tank through a hose (Item 7) about 5 m long.

The entire test is made with a closed circuit, i.e. no fuel escapes.



1 = Adapter connection hoses from line set KDJE-P200/25
2 = Injection valves
3 = Automatic connectors
4 = Tester hoses
5 = Return line to fuel tank filler neck

18.3 Setting up and connecting the tester:

Set the tester up beside the engine on a solid base (e.g. on tester trolley KDJE-W 100) and align it with the built-in spirit level at the base of the tester.

So that the rigid fuel-injection tubing is not bent too much, the tester for delivered quantity comparison is connected using the adapter connection hoses KDJE-P200/25.

Remove the injection valves completely.

Unscrew the fuel-injection tubing from the fuel distributor and connect the adapter connection hoses instead.

Screw the injection valves onto the adapter connection hoses.

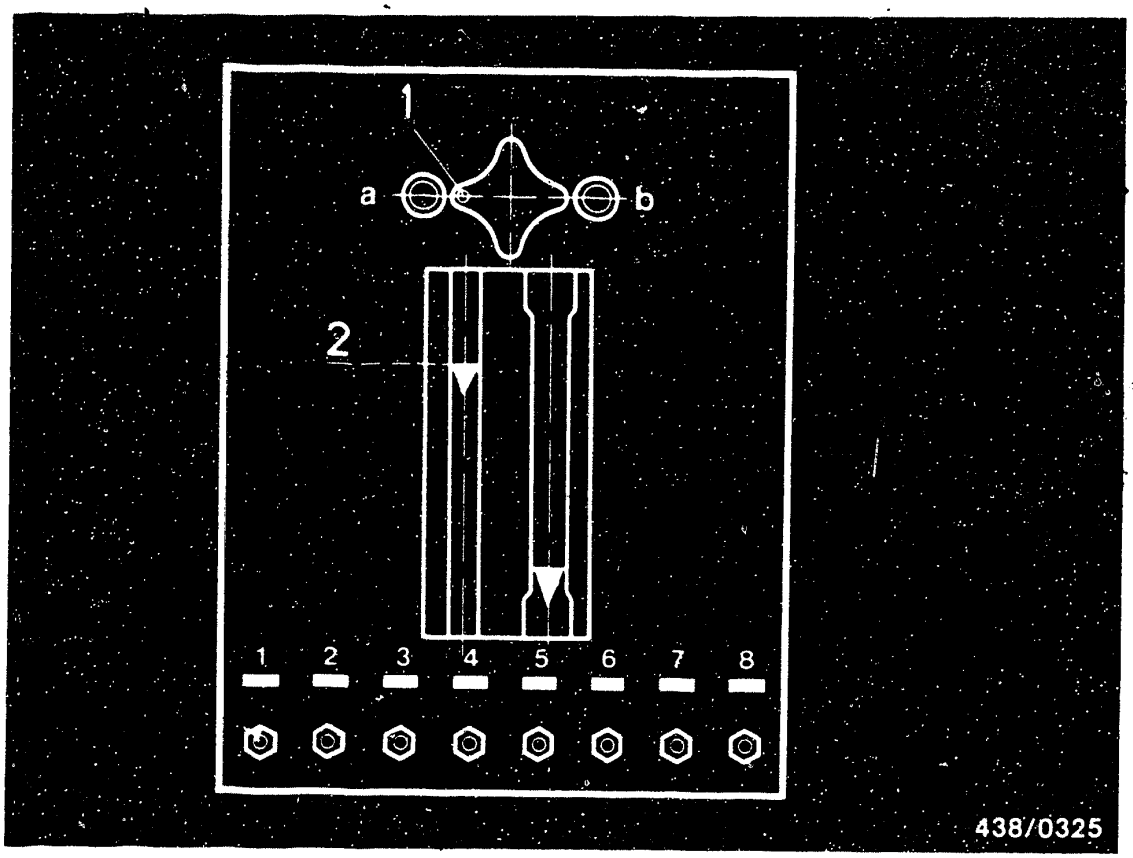
Clean the injection valves with a rag and insert injection valves into the automatic connectors of the first four tester hoses.

Note:
Insert the injection valves as far as they will go and tighten the knurled thumbscrews well so that the non-return valves of the automatic connectors are opened fully.

Introduce the return hose of the tester into the fuel tank filler neck.

18.4 Bleeding the tester:

Remove the air filter so that the air-flow sensor plate becomes accessible.
Remove the electric plugs from the warm-up regulator and the auxiliary-air device.
Switch on the electric fuel pump by bridging the electrical safety circuit.
Press down the air-flow sensor plate to the stop.
Press the keys on the 8-way valve one after the other, while simultaneously switching the 3-way stopcock until both rotameter tubes are bled.
Return the sensor plate to the rest position.



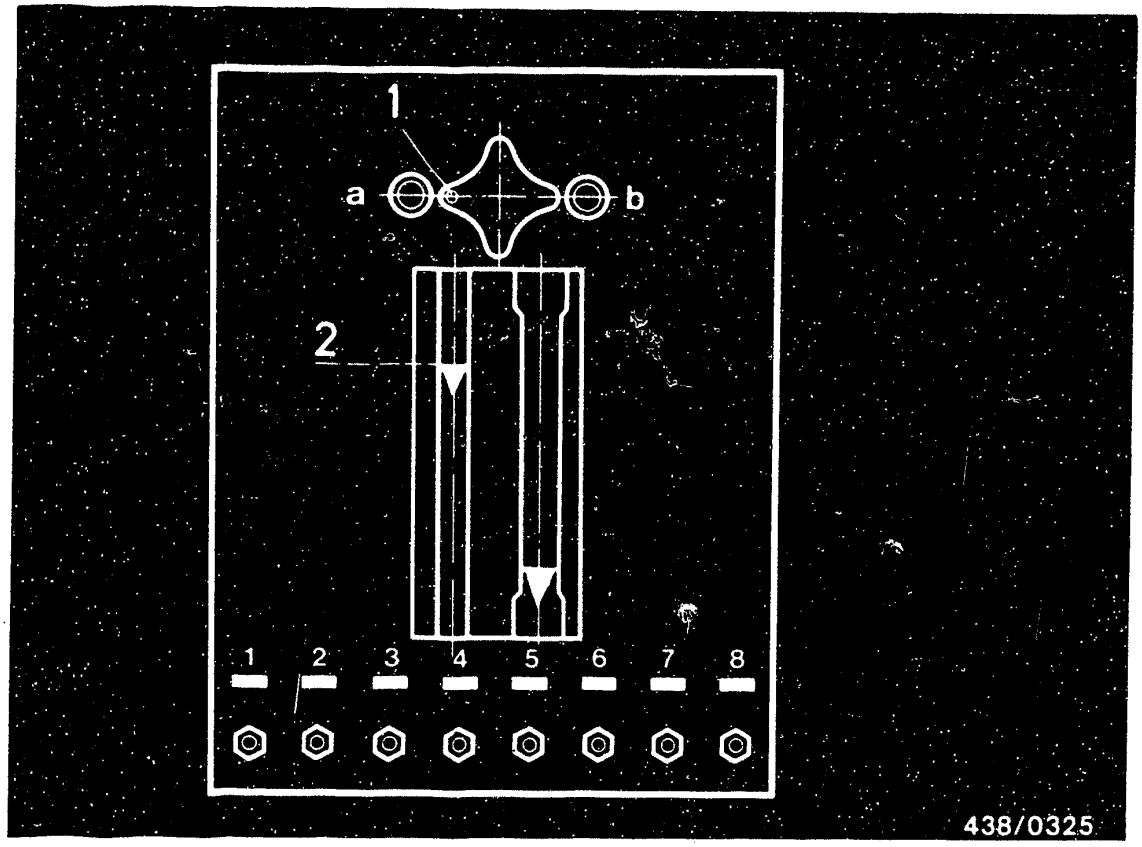
1 = White dot
2 = Measuring line

a = Idle
b = Part load/full load

18.5 Testing:

The flow comparison measurement is made in the idle, part-load and full-load ranges.

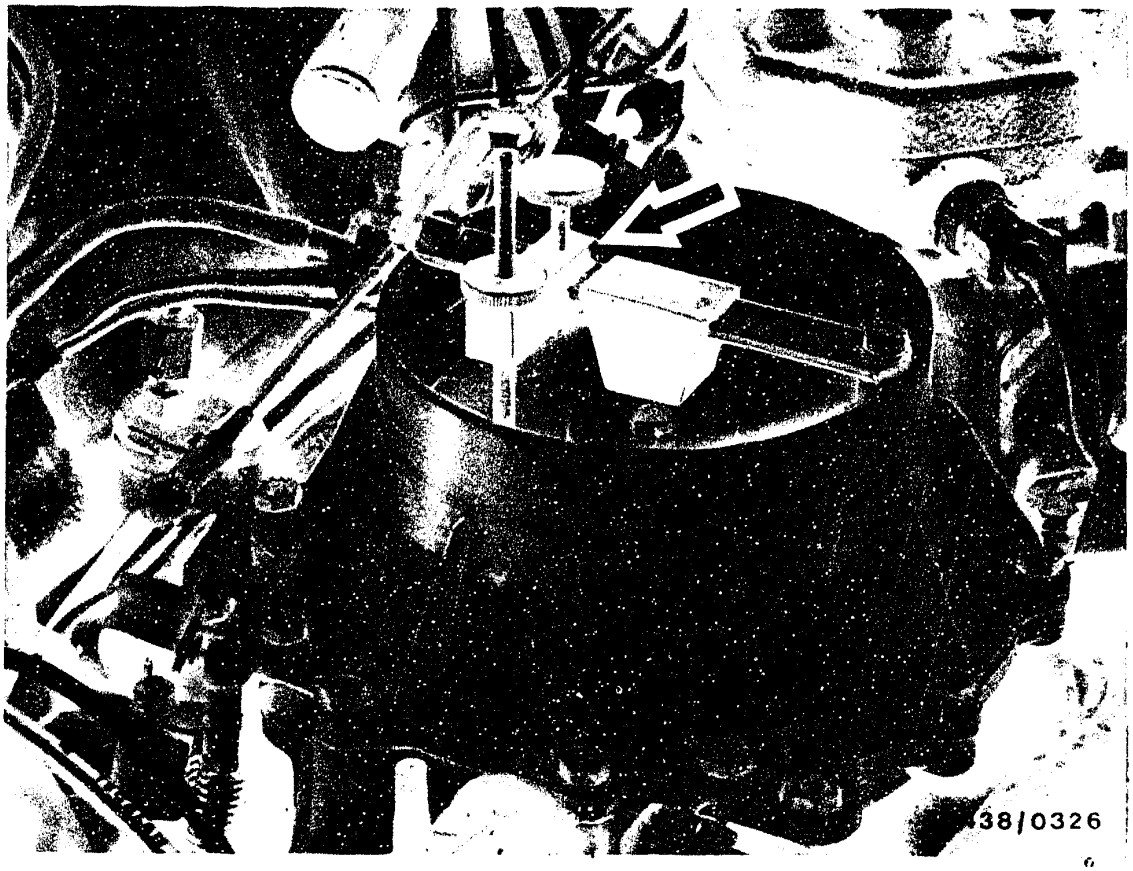
The small rotameter tube is to be used for the idle measurement (white dot to left on control knob); part-load and full-load measurements are made using the large rotameter tube (white dot to right).



1 = White dot
2 = Measuring line

a = Idle
b = Part load/full load

The delivered quantities indicated on the rotameter tubes are read off at the top edge of the conical float (Item 2).
On testers with a ball float the uppermost point of the ball is used for reading off. With each measurement be sure to wait until the float has reached its final position. This may take 20...30 seconds in the case of small deliveries.

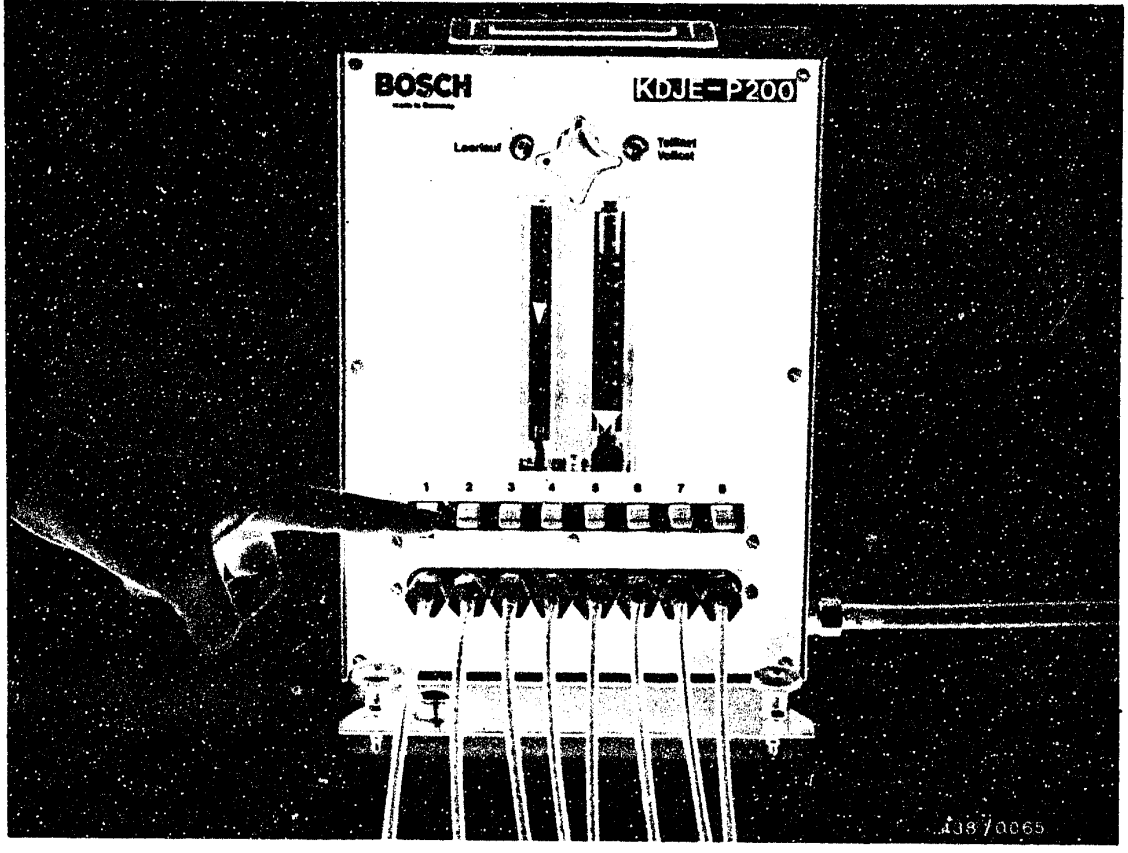


The exact setting and locating of the position of the air-flow sensor plate for the various load ranges is done using the setting device KDJE 7456.
With the adjusting screw initially screwed all the way out, the setting device is clamped onto the stop bracket of the air funnel (arrow).
Adjust the position of the air-flow sensor plate using the adjusting screw.

Procedure:

Switch on the electric fuel pump by bridging the electrical safety circuit.
Fixed numerical values are specified in the following test section for the maximum permissible fuel delivery differences for the individual load ranges.

The "set point" value always pertains to the fuel-distributor outlet with the lowest fuel delivery, i.e. in each case the outlet with the lowest delivery is to be first ascertained.



Press the key for outlet 1. Pivot the air-flow sensor plate until the corresponding rotameter tube approximately indicates the "set point" value. Fix the air-flow sensor plate in this position.

Test the remaining outlets in order to determine which outlet has the lowest fuel delivery.

Press the key for this outlet again, and set the delivery precisely to the "set point" by correcting the position of the air-flow sensor plate. Then fix the air-flow sensor plate in this position again.

Press the remaining keys one after the other, and determine the maximum fuel delivery of each outlet. A deviation in fuel delivery can only be above the "set point".

18.6 Test specifications

	Setpoint (cm^3/min)	Maximum permissible fuel delivery (cm^3/min)
Idle	6.0	7.2
Part load	40.0	46.0
Full load	100.0	110.0

If the test shows too great a deviation in one of the three load ranges, the test should be carried out again to make sure.

If the result is confirmed, check whether the fault lies in the fuel distributor or in the injection valves.

To do this, change the injection valves with the greatest deviation with that with the smallest.

If the result remains the same, the fault lies in the fuel distributor. If the fault follows the fuel-injection valves, then these are defective.

Replace defective fuel distributor or injection valves.

18.7 Final operations

Re-fit the injection valves properly.
Also fit the air filter. Make sure that all lines are laid correctly.
Re-connect the electrical safety circuit of the K-Jetronic properly.

It is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F18.

19. Idle-speed adjustment

19.1 Test conditions:

Warm up the engine for adjusting the idle speed (oil temperature approx. 80°C).

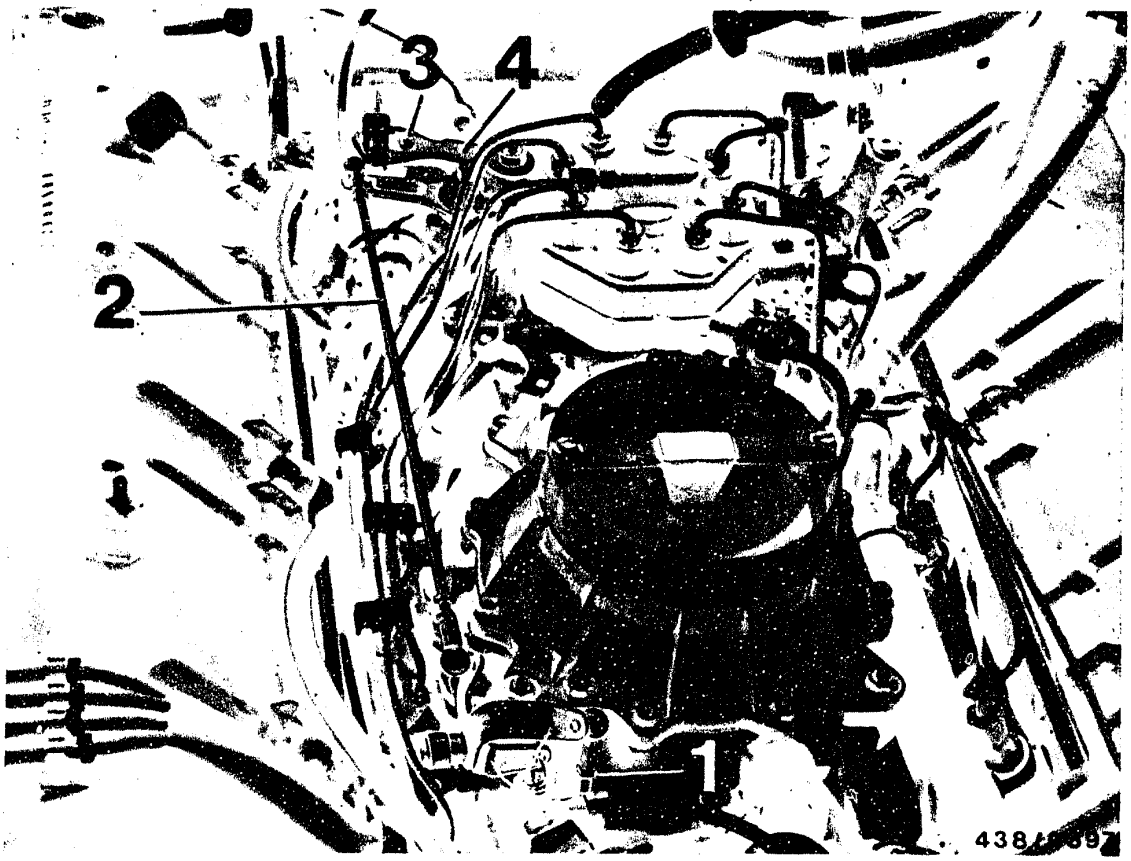
Important note:

If the fuel-injection tubing or injection valves were loosened or removed, the engine should be warmed up under load. The low rate of fuel flow during idling is not always adequate to drive all the air out of the fuel-injection tubing.

The idle speed must not be adjusted when the engine is too hot, e.g. immediately after being raced or after a power measurement on the roller-type test stand.

In vehicles with an air conditioner, this should be switched off in order to stabilize the engine speed.

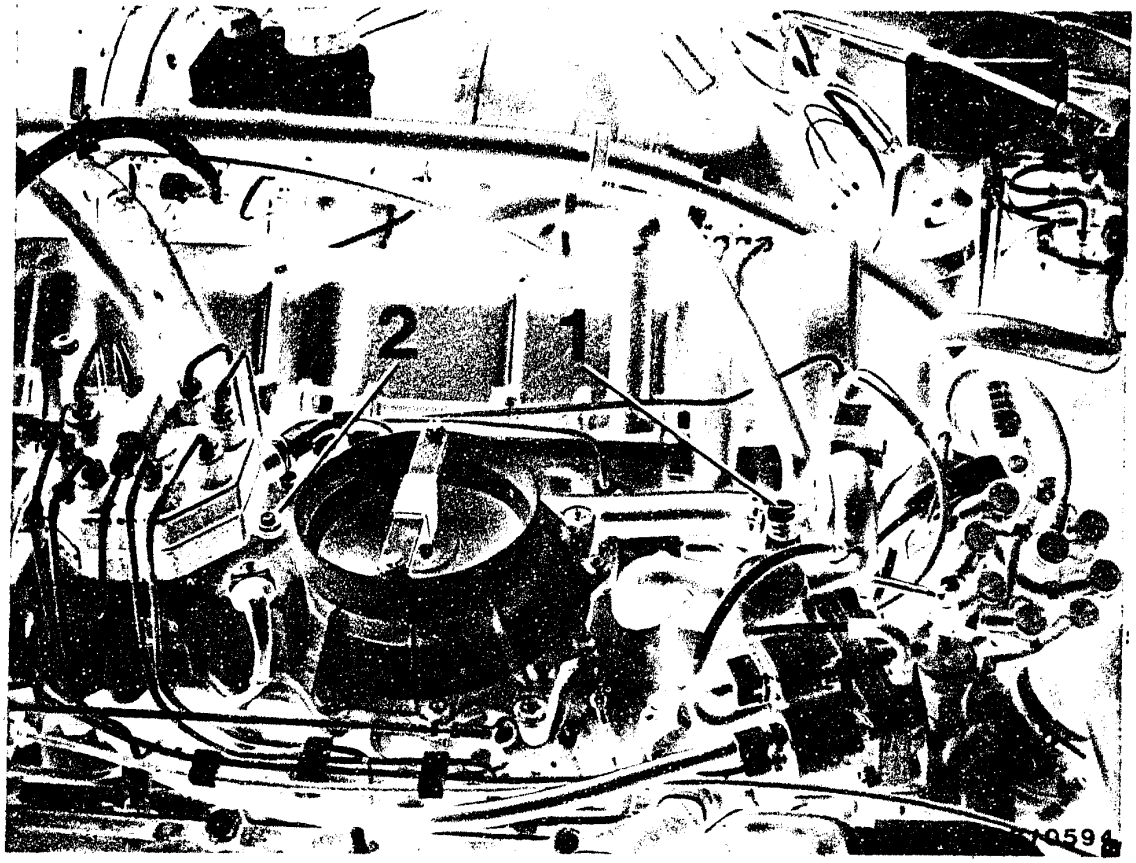
In vehicles with a cruise control check whether the wire cable is up against the regulating lever free of tension. If necessary, adjust the cable with the adjusting nut.



In vehicles with electric Tempomat, check that the correcting element is not up against the idle stop. If necessary, adjust the tie rod so that, when being hooked in, it pushes the lever of the correcting element approx. 1 mm away from the idle stop.

Unhook the link (1) from the throttle-valve assembly and check whether the throttle valve is up against the idle stop.

Hook the link back in again in such a manner that it is not under tension. To do this, adjust the crossbar (2) so that the roller (3) in the variable-fulcrum lever (4) is up against the end stop and is not under tension.



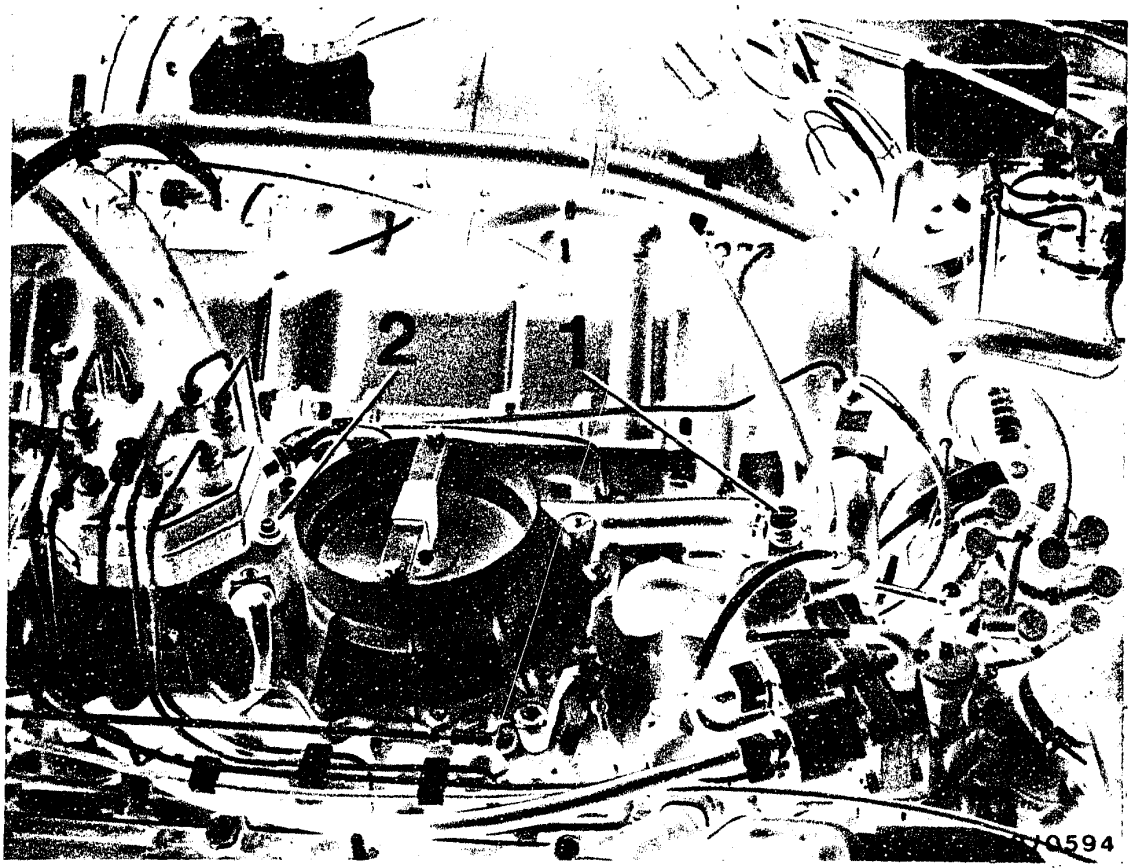
19.2 Adjusting the idle speed and CO concentration

The idle speed is adjusted at the bypass screw (1).

Select drive mode "D" with the selector lever (automatic transmission, switch on the air conditioner), turn the power-assisted steering to full lock.
The engine must continue running.

Test specifications - idle-speed adjustment:

Idle speed	
350/450 (116../117... engine)	700...750 min^{-1}
450 - 6.9 (100.. engine)	580...620 min^{-1}

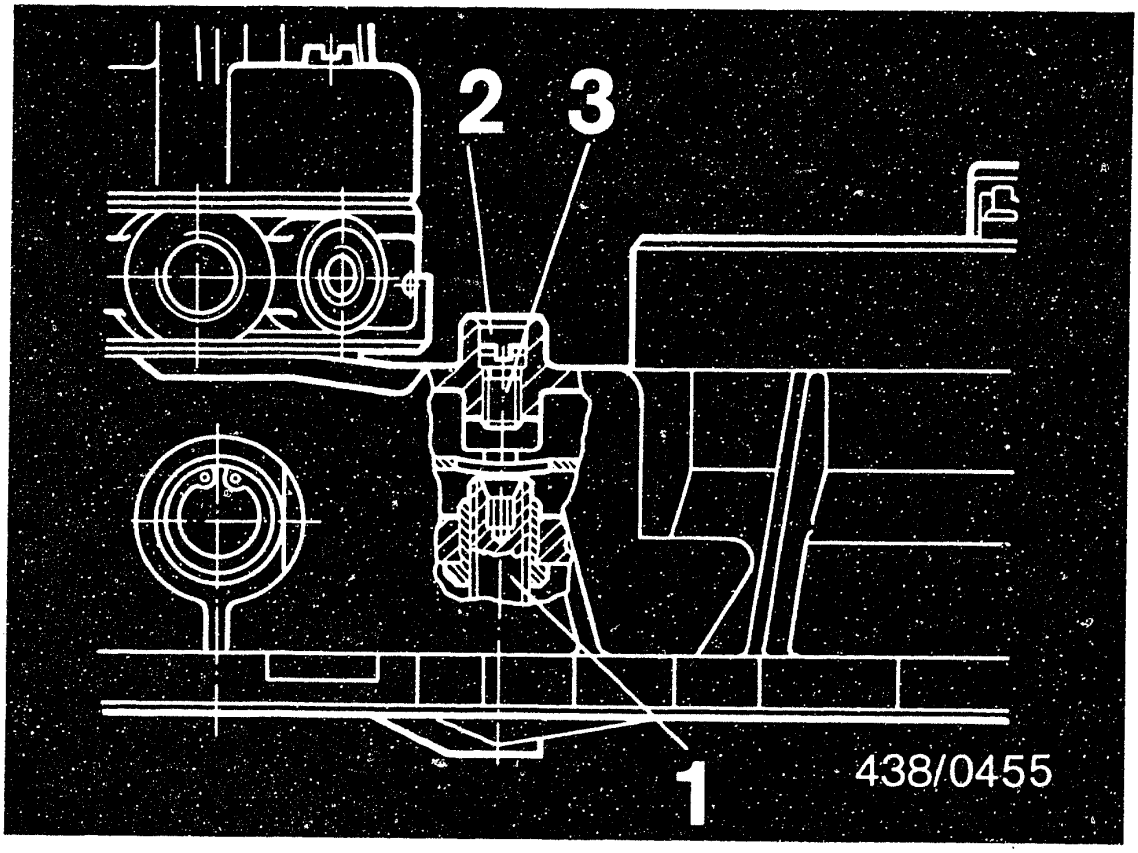


Adjusting the CO concentration

Adjust the CO concentration at the idle-mixture-adjusting screw (2) in the mixture-control unit.

CO concentration

350/450	0.5...1.5 % by vol.
450 - 6.9	1.0...2.0 % by vol.



Adjusting the CO content by turning the idle-mixture-adjusting screw (1) in the mixture-control unit using adjusting wrench KDEP 1035.

To get to the idle-mixture-adjusting screw, remove the anti-tamper plug (2) and the screw plug (3) in the air-flow sensor housing.

The adjusting wrench KDEP 1035 is passed through the housing bore and is inserted into the idle-mixture-adjusting screw.

Turning to the right = Richer mixture
Turning to the left = Leaner mixture

Caution:

Always make the adjustment from the lean side, i.e. if the mixture is too rich turn the idle-mixture-adjusting screw further to the left than necessary, and then turn it to the right up to the setting required.

Remove adjusting wrench after every adjustment and close the bore, since unmetered air would otherwise distort the CO reading.

After every adjustment, accelerate the engine briefly so that the intake lines cool down. Then wait until the indication on the CO Tester has stabilized. Never accelerate the engine with the wrench still in place as this could result in bending the control lever in the air-flow sensor.

19.3 Anti-tamper device for idle-mixture-adjusting screw:

In the Federal Republic of Germany, § 47 of the FMVSS/CUR, "Exhaust Gases and their Discharge", has been amended. This amendment order was printed in full in the Verkehrsblatt 13 of 15th July 1975.

Accordingly, all motor vehicles with externally supplied ignition produced as of 1st October 1976 must be provided with anti-tamper devices for the idle-mixture-adjusting equipment so that it is not possible to adjust the screw without destroying the anti-tamper device. The intention is to prevent non-experts from readjusting the idle setting and thus inadmissibly influencing the exhaust gas. Consequently, the anti-tamper caps may only be used in the workshop and must not be sold to customers for their own use.

These anti-tamper caps come in different colours. Use the following cap and colour for the after-sales service:
In the downdraft air-flow sensor:
Blue anti-tamper cap (not obtainable from Bosch).
Daimler-Benz Part No. 000.997. 5986
Deutsche Vergaser Gesellschaft: K 34 520

The anti-tamper device is removed and fitted using special tools (e.g. tool set No. 4521/7 from Hazet Co., D-5630 Remscheid).

After-sales Service

Technical Bulletin

43

Continuous Injection System mixture control-unit

VDT-I-438/100 B

Ed. 2 7.1975
Translation of German edition of 1.7.1975

The mixture control unit is still being reported as one defective unit in warranty claims. We wish to point out expressly that the mixture control unit consists of two separate products, the air-flow sensor and the fuel distributor, and that there are separate defect numbers for them in the warranty manual. Please report only the defective product.

Accessory Sets

Various fuel distributors and warm-up regulators have been supplied up to now with pressed-in plug connectors. These will no longer be supplied in future.

	no longer available	Replacement + accessory set
Fuel distributor	0 438 100 002	0 438 100 017
	0 438 100 003	0 438 100 005 + 2 437 001 001
	0 438 100 004	0 438 100 017
Warm-up regulator	0 438 140 002	0 438 140 004 + 1 437 000 000

The accessory sets contain the required number of tailpieces and seal rings.

Please note: the accessory set 2 437 001 000 is delivered included with the fuel distributor 0 438 100 017, and does not therefore need to be ordered separately.

Electric Fuel Pump

In the Technische Mitteilung VDT-BMO 114/1 B and the Service Information sheet VDT-I-740/2-1 B 1st. supplement, we announced that the non-return valve can be replaced on the electric fuel pump 0 580 254 996. We have come to the conclusion from the warranty claims that not enough use is being made of this possibility. Please bear this fact in mind and repair leaky electric fuel pumps before deciding to replace the entire assembly.

In case of inquiry, please contact your authorized representative.

ROBERT BOSCH GMBH
Geschäftsbereich KH
Kundendienst - Technik

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Technical Bulletin

Packaging of goods under warranty

438

K-Jetronic (CIS)

VDT-I-438/101 B
10. 1976

All components or assemblies of the K-Jetronic which are dispatched under warranty must be correctly and carefully packaged so that no further damage or impairments occur during transit, since these would not be covered by warranty.

Any fuel remnants must be removed from those K-Jetronic assemblies intended for dispatch, so as to eliminate any danger of fire during transit.

The intake openings and outlets of the assemblies must be sealed off with caps or plugs. As new products were fitted, the caps or plugs from these may be used.

The plunger of the fuel distributor is to be fitted with a protective cap of adequate size, or secured to the fuel distributor.

In addition, the assemblies are packed in tightly packed, well-sealed plastic sleeves. Fuel distributors and warm-up regulators are packed individualiy.

If components arrive damaged due to incorrect packaging or do not comply with these instructions, they can be returned and the warranty claim rejected.

BOSCH Geschäftsbereich KH Kundendienst. Kfz-Ausrüstung

After-sales Service

Technical Bulletin

Securing of idle-speed adjusting screws

K-Jetronic (CIS)

438

VDT-I-438/102 B
11.1976

According to a statutory regulation, changes have been made to § 47 of the German traffic licensing laws concerning exhaust gases and their outlets. This regulation was printed in full in traffic law sheet 13 of 15.7.75 .

Consequently, all motor vehicles with external-ignition engines must have their idle-speed adjusting devices secured from the 1st October 1976, so that adjustment of the screw is impossible without destroying the securing device. This should stop unskilled people from adjusting the installation of the idle-speed system and thereby illegally influencing the emission values. As from now, securing caps can only be used in the workshop and cannot be sold to customers for their own use.

Securing caps are produced in various colors. For after-sales service the following caps and colors are used:

downdraft air-flow sensor	
Blue	securing cap is not available from BOSCH. Part number is DB 000.997.59 86 from the Deutsche Vergaser Gesellschaft K 34 520
updraft air-flow sensor	
Red	Part number 3 430 522 002

These stipulations are only valid in countries where ECE regulations (Economic Commission for Europe) apply. The air-flow sensors must however be converted for the use of these securing caps, as a matter of principle. The caps can also be used in countries not subject to ECE regulations, to prevent dirt penetrating through the pipe to the adjustment in the case of updraft air-flow sensors.

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Technical Bulletin

SUPPLY PUMPS 0 580 ..

Overview of the non-return valves

438
VDT-I-438/104 En
9.1979

Replaceable non-return valves

Part Number	Appropriate seal ring	Fitted in supply pumps
1 583 385 004	1 580 203 002	0 580 254 990, ..991,..998
.. 006	.. 002	.. 985
1 583 386 008	.. 001	.. 987, ..988,..989
.. 011	.. 001	.. 986, ..996
.. 014	.. 001	.. 992
.. 016	1 580 105 001	.. 970, ..971,..972,
		.. 973, ..974,..980

Parts sets (comprising non-return valve complete with seal ring)

1 587 010 001	-	0 580 254 992
1 587 410 901	-	.. 978, ..982 FD823→

Supply pumps fitted with non-replaceable non-return valves

0 580 254 975, ..976, ..977, ..979 and ..982 → FD 822

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Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Technical Bulletin

FIRMLY FITTED NON-RETURN VALVE

VDT-I-438/107 En

Repairs
fuel pumps 0 580 254 ...

5.1980

Previously fuel pumps with non-exchangeable non-return valve (see VDT-I-438/104 En) had to be exchanged completely in cases of leakage in the non-return valve.

If the fuel pump is in working order and only the non-return valve leaks, there is now the possibility of repairs as part of after-sales service. 2 parts sets have been produced for this purpose, they contain, amongst other things, a tube fitting with built-in non-return valve.

Before using the parts set the installation conditions should be checked. The defective non-return valve can remain in the fuel pump which does not have to be dismantled for fitting the parts set. Before disconnecting the fuel lines the pressure fittings of the fuel pump and the fuel lines should be thoroughly cleaned.

Description and fitting

Parts set 1 587 010 003 for fuel connection with inlet union.

Screw the tube fitting (short side) with the thick flat seal ring into the pressure fitting and tighten. In doing so press against the hexagon of the pressure fitting with a wrench. Place the thin flat seal ring, the fuel-line inlet union and the other flat seal ring on to the long side of the tube fitting and tighten with the hexagon cap nut. Run the engine and check that there are no leaks in the connection.

Parts set 1 587 010 004 for fuel connection with nipple and union nut.

Screw the tube fitting with flat seal ring into the pressure fitting and tighten. In doing so press against the hexagon of the pressure fitting with a wrench. Screw the fuel line to the tube fitting with a union nut and tighten. Run the engine and check that there are no leaks in the connection.

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Technical Bulletin

HOT-STARTING PROBLEMS

438

VDT-I-438/105 En
3.1980
Replaces Ed. 2.1980

K-Jetronic

Hot-starting problems can occur in various vehicles fitted with K-Jetronic. This means that when an engine is switched off whilst still hot and then switched on again after a short period, it does not start as well as it should.

The engine, the ignition system and the K-Jetronic system in these vehicles should be carefully checked. With the K-Jetronic particular attention should be paid to the:

complete system (in case of leaks),
injection valves (in case of leaks),
correct position of the air-flow sensor plate (rest position).

Instructions can be found in the vehicle-related repair manuals VDT-W-438/5.. .

If the engine still does not start satisfactorily when hot, even after checking, a timing relay can be fitted in K-Jetronic systems which are not equipped with a solenoid valve for reducing the control pressure as additional starting help.

Timing relay 0 340 000 003 controls the start valve during hot starts. The start valve then injects extra fuel intermittently (sometimes cutting out completely.

The timing valve is fitted according to the wiring diagram (see reverse side). The fitting of this relay will be charged for.

After fitting the timing relay starting should be carried out as follows:

Vehicles with start valve in intake manifold - with open throttle valve,
Vehicles with start valve in idle duct - with closed throttle valve.

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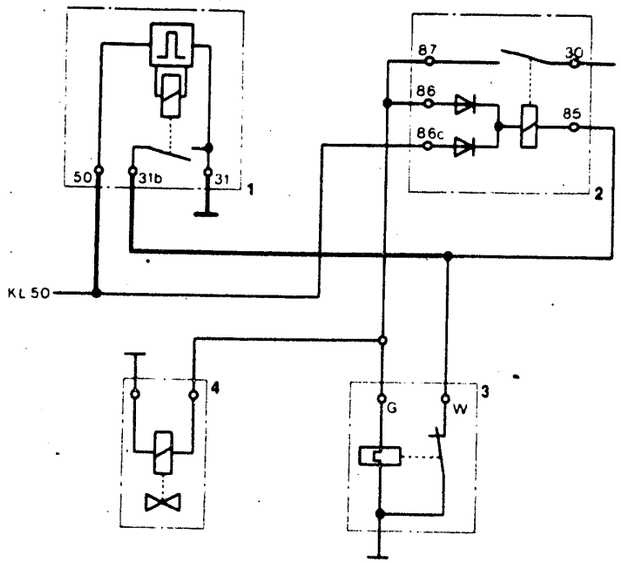
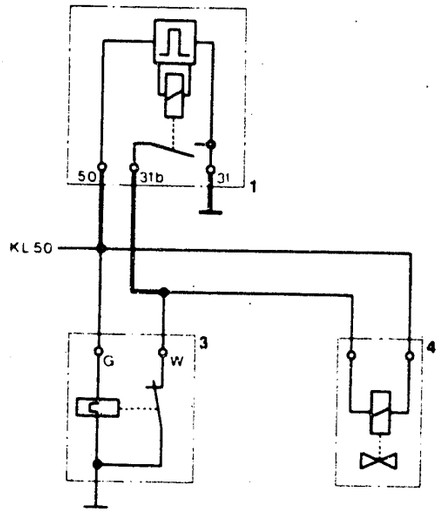


K-Jetronic system with post-injection relay

1 = Timing relay 0 340 000 003
2 = Post-injection relay
3 = Thermo-time switch
4 = Start valve



K-Jetronic system without post-injection relay

After-sales Service

Technical Bulletin

TUBE FITTING WITH FILTER IN WARM-UP REGULATOR 0 438 140 ...

VDT-I-438/106 En
4.1980

Warm-up regulator 0 438 140 065, used in MB 230 E, has a filter in the tube fitting for the fuel inlet to prevent dirt getting in.

When other warm-up regulators with the same connections give trouble or fail because of dirt getting in, then we recommend that you fit the new warm-up regulator with this tube fitting with filter, part no. 1 433 356 802.

During assembly a flat seal ring A 10 x 14 DIN 7603-C-CU, part no. 2 916 710 649, is laid underneath and the tube fitting is tightened with 20...22 Nm (2.0-2.2).

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Service Information

Mercedes-Benz
Engines 100, 110, 116 and 117
with K-Jetronic (CIS)
Fuel-line pressure dampers
0 280 161 005, . . 007

VDT-I-MB 013 B

August 1976

In the case of the customer complaint "engine stalls and will not re-start" the trouble can lie with the fuel-line pressure damper in the control pressure line, which leads from the warm-up regulator to the fuel distributor.

If the membrane in the fuel-line pressure damper is leaky, fuel can flow via the drain line into the air guide housing or via the shaped hose to the idle-air passage, into the intake manifold and possibly into the vacuum line of the automatic gearbox. Starting attemps can result in engine damage caused by fuel knock, since this fuel is sucked in by the engine.

Leaky fuel-line pressure dampers must be exchanged. When doing this the fuel should be sucked out of the lower part of the intake manifold and out of the cylinders by using a suitable syringe.

Checking and replacing the fuel-line pressure damper

Remove the air filter. Pull off the drain line from the air guide housing shaped hose fuel-line pressure damper as the case may be. Collect any fuel which may escape.

Switch on the ignition and pull the plug off the safety switch so that the fuel pump operates.

Should any fuel now appear on either the drain line or on the fuel-line pressure damper, then the membrane in the fuel-line pressure damper is defective.

Fit the new fuel-line pressure damper in such a way that the lug on the support catches in the groove in the fuel-line pressure damper housing.

Draw off the fuel in the lower part of the intake manifold and the cylinders with an appropriate syringe as follows:

- Screw the vacuum connection (for the brake) off the intake manifold. Lead a plastic line (similar to the one used for ignition point-adjustment) into the intake manifold connection up to the lower part of the intake manifold and draw off the fuel. Screw the vacuum connection back on.
- Screw out all the spark plugs and draw off the fuel from each of the cylinders.

In the case of vehicles with automatic gearbox pull the sealing cap off the plastic vacuum unit on the gearbox, so that any fuel still present can flow out; subsequently re-fit the sealing cap.

Let the engine run and check the fuel-line pressure damper for leaks by pulling off the drain line.

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After-sales Service

Motor Vehicle Service Information

Mercedes-Benz Passenger Cars

VDT-I-MB 016 B

9. 1977

with K-Jetronic

Modified fuel pump

Up to now Mercedes-Benz have employed fuel pump 0 580 254 984 (see also VDT-I-MB 006 B). This pump has now been superseded by ... 975. The pumps are identical in operation, but have different intake tubes: new 15 mm dia., old 12 mm dia. This change also required that the diameter of the intake tube on the damper device and of the fuel hose between the damper and fuel pump be altered.

This modification is intended to achieve uniform intake characteristics under all climatic conditions.

The following parts are required for the conversion:

from Bosch	
Fuel pump	0 580 254 975
from Mercedes-Benz	
Damping device	116 470 03 16
Fuel hose approx. 50 mm long	107 476 01 26
Hose clamp	91 6002 0211 00

BOSCH Geschäftsbereich KH. Kundendienst Kfz-Ausrüstung

After-sales Service

Motor Vehicle Service Information

Mercedes-Benz

VDT-I-MB 017 B
9. 1977

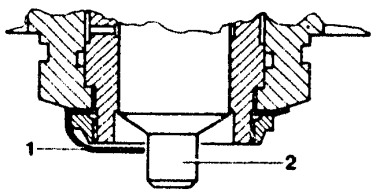
Passenger-car Engines 100, 110, 116 and 117 with K-Jetronic

Fuel distributor with retainer to prevent control plunger dropping out

As from FD (date of manufacture) 724 the fuel distributors 0 438 100 011 and 012 for the above-mentioned engines have been fitted with a retainer to prevent the control plunger dropping out.

The retainer, in the form of a metal tab, also serves to secure the fuel distributor during transit and to facilitate installation.

The retainer must not be removed.



1 = Retainer
2 = Control plunger

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